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GOVERNMENT OF INDIA
TARIFF COMMISSION

REPORT

ON

The Prices of Electric Lamps and Fluorescent Tubes

BOMBAY
1963

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India, Tariff (———Commission)
Report on the prices of Electric
Lamps and Fluorescent Tubes
1963.

PERSONNEL OF THE COMMISSION

Shri K. R. P. Aiyangar	*Chairman*
Shri J. N. Sen Gupta	*Member*
Dr. R. Balakrishna	*Member*

SECRETARY

Shri Pramod Singh

Errata List to the Report on The Prices of Electric Lamps and Fluorescent Tubes (1963)

1. Page 24, in Table II, against the item "Conversion cost" under column "A" of "4'-40 watts", *for* the figure "46.69" *read* "46.79".

2. Page 25—

   (a) In Table III, under the "Unit" column, *for* "ther material cost" *read* "other material cost".

   (b) In the same Table, under column 'B' of "80 watts 80 m.m.", against "Total Ex-Factory Cost", *for* the figure "34.45" *read* "35.45".

3. Pages 34 & 35, in Table I (a)—

   (a) against serial numbers 7, 9, 11 and 13, *insert* the word "Total".

   Page 35—(b) against serial number 13, under column A of "40 Watts (60 mm) clear", *for* the figure "54.94" *read* "54.96".

4. Page 42, in Table III, under the column "400 watts Fluorescent", against item 1(c) "Cost of Burners", *for* the figure "25.16" *read* "24.16".

5. Page 50, Para 13.1, in the first sentence, after line four, *delete* the whole of line five, and in its place *substitute* lines 6 and 7. *Read* the next sentence *as* "The first preoccupation of the industry should be to ease the scarcity situation by augmenting production".

6. Page 74, Appendix III, against Serial No. 1, under "Date of visit", *for* "21st September 1961" *read* "21st September, 1962".

7. Page 87, Appendix VI, in Paragraph 2.3, line 2, *for* "Steet" *read* "Steel".

8. Page 92 Appendix VII, under "Name of producers of components", *for* "C. Glass tudes and rods" *read* "C. Glass tubes and rods".

GIPN—S3—12 T. C. Bom./65—18-12-65—500.

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Government of India

MINISTRY OF INDUSTRY AND SUPPLY

(Department of Industry)

New Delhi, the 19th December, 1964.
28th Agrahayana, 1886 (S).

RESOLUTION

Subject.—Price of Electric Lamps & Fluorescent Tubes.

G.S.R. No. 4(20)/60(EE).—The Government of India had received several representations that there was shortage of low wattage lamps and fluorescent tubes and that high prices were being charged for electric lamps taking advantage of this shortage. The Government, therefore, requested the Tariff Commission to investigate the cost structure of electric lamps and recommend fair selling price of various types of lamps under Section 12(d) of the Tariff Commission Act, 1951. The report of the Commission has now been received. The main recommendations of the Commission are :—

(a) The fair prices of (i) General Lighting Service Lamps and Train Lamps (ii) Fluorescent Tubes (iii) High Pressure Mercury Vapour Lamps and (iv) Miniature Lamps, as determined by the Tariff Commission, are given in the statement enclosed (Annexure I). These prices are exclusive of Union excise and State and local levies, if any, but include such duties on glass shells and other materials used in the process of production. In the case of High Pressure Mercury Vapour Lamps and Automobile Lamps the prices recommended are to be taken only as indicators.

(b) The fair prices recommended should be in force for 3 years and a further inquiry should be undertaken well before the end of that period.

(c) In order to step up production in the short run and bring down costs, second shift operation of one of the existing automatic lines of production in the industry should be permitted. Gradually as the demand increased the other automatic lines of production may also be permitted double shifts on a phased basis. Careful consideration may also be given to meeting the maintenance requirements such as components and raw materials of Units which have already installed modern automatic equipment and can work partially a second shift.

(d) For the immediate increase of the supply of fluorescent lamps, M/s. Hind Lamps Ltd., may be licensed to work double shift.

(e) Licences not implemented beyond a reasonable period should be cancelled and allocated to other existing units.

(f) No further licensing for the manufacture of lamps is desirable unless such parties are assured of regular supplies of components such as shells, tubes and caps.

(g) Efforts should be made for substituting aluminium for brass for the manufacture of caps.

(h) The practice of stamping prices on lamp cartons already adopted by some producers should be generally followed and retail prices should to the extent possible also be stamped on lamp in order that there could be some control over re-sale prices. The producers should consider arrangements by which, they could through their agreements with selling agents and other distributors, ensure some control over margins, so that the retail prices are effectively implemented in the interest of consumers.

(i) All the lamp manufacturers should take immediate steps to use 60 mm. shells for 75 and 100 watt lamps also.

(j) Setting up of separate units as are already licensed for manufacturing components should be expedited and possibility of setting up of special units for making glass shells and glass tubes should be explored further.

(k) The electric lamp industry still stand in need of several imported components like rods, lead-in-wire, tungsten filament etc. Steps should be taken to help production of such components early within the country. The indigenous manufacture of glass tubes for blowing miniature shells and caps for miniature lamps should be encouraged.

(l) Units in the small scale sector should be encouraged to develop the manufacture of miniature lamps which cannot be standardised on the production side.

2. There is at present no statutory control over the prices of electric lamps but, the Government of India agree that all the lamp manufacturers should follow the practice of stamping the retail prices on lamp cartons, to enable the consumers know the fair prices. The Government of India also accept the other recommendations of the Tariff Commission in principle with the reservation that permission to any other unit to work a second shift should be synchronised with increased availability of components and raw materials so as not to cause any dislocation in the production of other existing units.

3. The fair factory prices determined by the Tariff Commission are based on the current level of customs levies on imported components. According to Customs Notification No. 58, dated 22nd February 1958, lamp-making raw materials and component parts except glass shells and standard bayonet caps, are exempted from the whole of

Customs Duty leviable thereon under the Indian Tariff Act, 1934 (32 of 1934). For the past several years there is a complete ban on the import of the types of lamps manufactured in the country. It has, therefore, been decided to withdraw the duty free concession and the fair selling prices of the various types of lamps after withdrawal of the concession are given at Annexure II. The Tariff Commission has agreed to this modification.

4. The Government of India hope that the industry and the trade would pay due regard to the recommendations of the Tariff Commission about the fair prices and would voluntarily adopt in practice a policy of not exceeding the price limits suggested by them.

ORDER

ORDERED that a copy of the Resolution be communicated to all concerned and that it be published in the Gazette of India.

K. V. VENKATACHALAM,
Joint Secretary to the Government of India.

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(Rs. per 100 lamps)

	Day Light		White	
	Fair factory price (f.o.r. destination)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination)	Fair retail selling price rounded off to next higher rupee
II. *Fluorescent Tubes* :				
2′ 20 Watts	242·76	389	247·31	396
4′ 40 Watts	318·62	510	327·08	523
5′ 80 Watts	408·72	654	419·12	671

III. *High Pressure Mercury vapour Lamps* :

	Fluorescent	Non-Fluorescent
	Fair factory price per lamp* Rs.	Fair factory price per lamp* Rs.
80 Watts	30·42	29·10
125 Watts	31·67	30·12
250 Watts	42·29	40·36
400 Watts	55·22	52·90
700 Watts	90·81	86·91
1000 Watts	110·26	105·14

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IV. *Miniature Lamps* :	Fair factory price*	Fair retail selling price rounded off to next higher rupees
	Rs. per 100	Rs. per 100
(a) Torch (all type including pre-focus)	15·62	25
Radio dial map lamp . .	26·01	42

ANNEXURE—I

Statement of Fair Factory and Retail Prices for Future (As Proposed by the Tariff Commission)

(Rs. per 100 lamps)

	CLEAR		FROSTED		DAY LIGHT		RED		BLUE		GREEN	
	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o r. destination basis)	Fair retail selling price rounded off to next higher rupee.
1	2	3	4	5	6	7	8	9	10	11	12	13
I. (a) *GLS Lamps :*												
15 Watts .	58·40	94	61·86	99	..	..	89·99	144	83·75	134	80·98	130
25 Watts .	61·57	99	65·73	106	84·71	136	93·71	150	86·09	138	84·71	136
40 Watts .	62·66	101	66·82	107	85·80	138	94·80	152	87·18	140	85·80	138
60 Watts .	63·78	103	67·94	109	86·92	140	95·92	154	88·30	142	86·92	140
75 Watts .	72·33	116	77·18	124	97·27	156	..	..	..	..	..	..
100 Watts .	73·66	118	78·51	126	98·60	158	..	..	..	..	..	..
150 Watts .	114·64	184	121·41	195	..	..	..	..	..	..	..	..
200 Watts .	137·09	220	145·22	233	..	..	..	..	..	..	..	..
(b) *High Wattage*												
300 . .	240·70	386	..	..	..	..	..	..	..	..	..	..
500 . .	369·33	591	..	..	..	..	..	..	..	..	..	..
1000 . .	561·18	898	..	..	..	..	..	..	..	..	..	..
1500 . .	751·25	1,202	..	..	..	..	..	..	..	..	..	..
(c) *Train Light* .	61·84	..	65.30	..	..	..	..	..	..	..	84.00	..
Loco Head Light	318·24	..	..	..	..	..	..	..	..	..	..	..

	Fluorescent	Non-Fluorescent
	Fair factory price per lamp* Rs.	Fair factory price per lamp* Rs.
(b) *Auto Lamp-Head Light :*		
Bosch type—6 & 12 Volts 36/36 .	81·22	130
Cap & Shell—24 Volts 36/36	86·87	139
Prefocus type—6 & 12 Volts 36/36	97·77	157
Cap & Shell—24 Volts 36/36 .	104·00	167
Tail lamp & side lamp with double filament—6,12, 24 Volts .	52·02	84
Tail lamp & side lamp with single filament 6, 12 and 24 Volts .	45·56	73

NOTES :

(a) For lamps upto 100 watts, the prices are for single coil filament lamps. For coiled and reinforced coil lamps of these wattages Rs. 1·88 for ex-factory and Rs. 3 for retail prices are to be added.

(b) Prices for torch lamps are ceiling prices.

*f.o.r. destination.

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ANNEXURE—II

Statement of Revised Fair prices for the Future as Recommended by the Tariff Commission Taking into Account the Incidence of Customs Duty

(Rs. per 100 lamps)

Description of lamps	Fair factory price (f.o.r. destination)	Import duty on raw material at existing rates (approx. & rounded off)	Fair factory price with import Duty (2)+(3)	Retail price proposed (including margin of 60% for distributor)
1	2	3	4	5
I. (a) *General Lighting Service Lamps (Clear):*				
15 Watts . . .	58·40	5	63·40	102
25 Watts . . .	61·57	5	66·57	107
40 Watts . . .	62·66	6	68·66	110
60 Watts . . .	63·78	6	69·78	112
75 Watts . . .	72·33	7	79·33	126
100 Watts . .	73·66	7	80·66	129
150 Watts . . .	114·64	9	123·64	197
200 Watts . . .	137·09	11	148·09	236
(b) *High Wattage :*				
300 Watts . . .	240·70	24	264·70	423
500 Watts . . .	369·33	46	415·33	664
1000 Watts . . .	561·18	60	621·18	993
1500 Watts . . .	751·25	127	878·25	1405
(c) *Train Light* . .	61·84	5	66·84	..
(d) *Loco Head Light* .	318·24	56	374·24	..
II. *Fluorescent Tubes :*				
2′—20 Watts day light .	242·76	70	312·76	500
4′—40 Watts day light .	318·62	84	402·62	643
5′—80 Watts day light .	408·72	100	508·72	813

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REPORT ON THE PRICES OF ELECTRIC LAMPS AND FLUORESCENT TUBES

1. Reference to the Commission.

1.1. Several representations had been received by the Government of India since 1960 from various associations about shortage of low wattage lamps and fluorescent tubes and the steep rise in prices of electric lamps. These also suggested that as a remedy there might be some relaxation of restriction on imports. The Development Council for Light Electrical Industries discussed these matters and recommended that manufacturing units should produce at least one-third of their total output in low wattage vacuum lamps. To prevent dealers from taking advantage of prevailing shortages and charging high prices, producers were required to give wide publicity to their retail selling prices. These recommendations were accepted by Government and the manufacturers were advised to act on them. To relieve shortage, Government approved of more schemes for production and also increased foreign exchange allocations to the industry to enable better utilisation of installed capacity.

1.2.1. With a view to consider the long term aspects of the case Government in the Ministry of Commerce and Industry letter No. EEI-4(20)/60, dated the 11th May 1961 (Appendix I), have also requested us under Section 12(d) of the Tariff Commission Act, 1951 to investigate into the cost structure of the electric lamp industry and recommend fair selling prices of various types of electric lamps.

1.2.2. While steps were taken to collect relevant data the public inquiry into the industry could not be taken up earlier as several important price cases already referred to us, *e.g.*, sugar, cement, woollens, iron and steel and cotton textile industries, had to be dealt with. Lapse of time, however, has not materially changed the position complained about in the industry since the matter was referred to us.

2. Scope of the inquiry.

2.1. The scope of the present inquiry, the first in respect of electric lamps, in our view needs to be much more comprehensive than what may be inferred from the reference. The complaint about high selling prices was in respect of almost all types of electric lamps including those belonging to miniature group and fluorescent tubes. The impact of the measures taken to overcome the shortage as stated in our reference has also to be considered. Consequently, the present inquiry is expected to cover fixing of fair prices for almost all types of electric lamps manufactured in the country and formulate measures by which rise in prices can be checked.

2.2. Electric lamps which are the subject of our inquiry may be broadly classified into incandescent and gaseous discharge lamps. The general light service lamps (GLS) and the miniature bulbs of various categories such as automobile bulbs, torch bulbs, cycle dynamo bulbs and radio dial bulbs belong to the first category. The common feature of all items in this group is that the source of light is a filament heated to incandescence though the products differ in size and end use. GLS lamps may be of various wattages ranging from 15 to 1500 watts. Those below 40 watts are generally termed as low wattage ones and they are mostly vacuum lamps. Others, 40 watts and above, are generally gas-filled. In the miniature group also lamps vary in size, shape and the end uses to which they are put. Fluorescent tubes and other types of discharge lamps belonging to the second category differ in their construction, technique of production and costs as compared with incandescent lamps.

3. Method of inquiry.

3.1. To gather all the available data about the industry we issued a press note in August 1961 inviting all interested parties to obtain copies of relevant questionnaires prepared by us and send their replies. Classified questionnaires appropriate for producers, consumers and dealers were also made available. Special organisations like the Development wing (now the Department of Technical Development), Development Commissioner for Small Scale Industries and the Indian Standards Institution were addressed for eliciting information. The Director General of Supplies and Disposals and the State Governments were requested to offer their views. A list of organisations to whom such references were made is given in Appendix II. A list of factories visited by the Commission and its officers in connection with this inquiry is given in Appendix III. The public inquiry was held on 19th December 1962 and cost discussions with producers in January 1963. A list of persons who attended the public inquiry is given in Appendix IV.

3.2. *Selection of units for costing.*—For determination of fair selling prices, cost investigation of a few selected units is one of the means generally adopted by us. For this purpose we selected the following four manufacturing units out of eighteen in the organised sector and one from the small-scale sector.

1. Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta;	Organised sector.
2. Pradip Lamps Works, Patna;	
3. The Mysore Lamp Works Ltd., Bangalore;	
4. B. Chowdhury & Co., Bombay.	
5. Sunder & Kapoor, Bombay	Small-scale sector.

The selection was made having in view the necessity to make the sample fairly representative of the universe. Among the units selected, GLS and other allied lamps are produced by three units, having a capacity of 23.70 million lamps out of a total of 62.60 millions, thus accounting for about 38 per cent of the total capacity. In terms of actual production their output of 19.22 million lamps in 1961 out of a total of 44.97 millions represented about 43 per cent of the total output. In respect of fluorescent tubes and other discharge lamps three selected units out of a total of four in the industry account for about 70 per cent of the total capacity and about 90 per cent of the actual output based on the level of production in 1961 for fluorescent tubes and 100 per cent of high pressure mercury vapour discharge lamps. So far as miniature lamps are concerned, two selected units out of a total of ten in the industry engaged in their production account for about 31 per cent of the total capacity and about 25 per cent of the total output of such lamps in 1961. It would, therefore, be apparent that the selection of units made for purposes of cost investigation are adequately representative of the industry. As regards capital investment the selected units in the organised sector account for about 31 per cent of the net block, after depreciation, in that sector. In terms of employed capital they account for about 38 per cent of the total employed capital in the industry. Regarding net sales the selected units have to their credit about 46 per cent of the total net sales of the industry. These data pertain to the year 1960-61 and they confirm the suitability of the sample.

4. Growth and present position of the industry.

4.1. The manufacture of GLS electric lamps in the country was started on a small scale in 1933 by the Bengal Electric Lamp Works Ltd. With the inception of the Electric Lamp Manufacturers (India) Pvt. Ltd. in Calcutta in 1939 the real foundation of the present electric lamps industry in the country was laid. A number of small units have come into existence since then but there was only a modest rate of growth of the industry till the commencement of the first Plan period. Subsequently there was an acceleration and diversification of production and more licensing of units so that the share of the single large producer, ELMI, became less dominant.

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4.2. Capacity and output.

4.2.1. The capacity for GLS and allied lamps reached 62.60 millions towards the end of 1962 from 23.05 millions in 1951. In respect of fluorescent lamps the capacity is still at a modest level of 3.30 million lamps.

4.2.2. The actual production of GLS and allied lamps was 44.97 millions in 1961 and 25.18 millions in the first half of 1962, production of GLS lamps being about 90 per cent of the total production in this category. Thus the output has barely kept pace with the capacity of the industry. In respect of fluorescent lamps the actual output was 2.10 millions in 1961 and 1.51 millions in January-June 1962.

4.2.3. The following statement gives details of existing and additional licensed capacity and the production during the last four years for different categories of lamps both by units in the organised sector as well as in the small-scale sector. Appendix V also gives details of individual units by categories.

(In million Nos.)

Types of lamps	Existing capacity	Additional licened capacity	Total licensed capacity	Production				
				1958	1959	1960	1961	1962 (January-June)
1	2	3	4	5	6	7	8	9
A. *Organised sector*								
1. GLS and other allied lamps .	62·60	19·46	82·06	29·58	33·69	39·83	44·97	25·18
2. Miniature and other allied lamps . .	28·75	34·45	63·20	10·64	15·35	17·65	25·78	12·71
3. Fluorescent tube . . .	3·30	8·29	11·59	0·99	1·10	1·53	2·10	1·51
4. High pressure mercury vapour lamps . .	0·160	0·245	0·405	0·004	0·014	0·029	0·044	0·041
B. *Small-scale sector*								
Miniature and other allied lamps . .	23·87	N.A.	23·87	N.A.	0·20	0·96	2·13	2·01

4.2.4. The capacities indicated in the preceding paragraph (except for fluorescent tubes produced by (ELMI) are on the basis of single shift operation. Though in terms of industrial licensing there is no bar to working more shifts, the units producing GLS and allied lamps and miniature lamps are working only on single shift basis. It is only in the case of fluorescent tubes that one of the units, ELMI is working double shift. Operation of the units is restricted to a single shift basis by a strict regulation of the imported quota of raw materials and components available to them. The policy seems to be to spread the foreign exchange earmarked evenly among all the producing units so that at least one shift operation may be possible for all of them. It should be obvious from this description of present operation of shifts that the existing shortage of electric lamps with attendant difficulties in reducing costs is a result more of the administrative arrangements made for operating the industry than to the absence of capacity for production. The rationale of this arrangement will come in for a more detailed examination at a later stage in the report. Further in terms of the present licensing policy we understand that production units in future cannot import freely two main components, namely, glass shells and tubes and brass caps, but should arrange to use indigenous products. The present output of these is not adequate, new licences not having added materially to their production. For overcoming shortage of lamps in the short period although capacity in the industry exists it cannot be quickly utilised.

4.3. *Production units.*

4.3.1. *Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta.*—This is the biggest among the existing manufacturing units in the country and commenced production in 1939. The company has been formed by five foreign firms previously engaged in the import of lamps sharing among themselves the full financial investment. They are (1) General Electric Company Ltd., (2) The Associated Electrical Industries (Rugby) Ltd., (3) Crompton Parkinson Ltd., (4) Associated Electrical Industries (Woolwich) Ltd., and (5) Midland Bank Executor and Trustee Co. Ltd., on behalf of Philips. Its Technical Collaborators are N. V. Philips Gloeilampenfabricken of Holland. ELMI's total paid-up capital is Rs. 35 lakhs and net capital block after depreciation is Rs. 52.80 lakhs. Its total employed capital in 1960 was Rs. 65.75 lakhs and value of net sales was Rs. 136.83 lakhs. The company is engaged in the manufacture of GLS lamps, fluorescent tubes and some varieties of miniature lamps. A special feature of the unit is the manufacture of components like glass shells for GLS lamps both by the traditional method of hand blowing and by means of automatic machinery and glass tubes for fluorescent tubes. Another feature is that its entire output is sold to its five constituents with their respective brand names for distribution.

4.3.2. *Hind Lamps Ltd., Shikohabad.*—This company was also formed by a similar collaboration of five foreign companies with an Indian unit. Philips as in the case of ELMI also provides the technical know-how. Bajaj Electricals Ltd., Bombay, holds about 50 per cent of the capital. The company commenced production in 1952 and produces GLS and other allied lamps, miniature lamps and fluorescent tubes. Like ELMI it is also a manufacturer of glass shells for GLS lamps. Till the middle of 1962 it was the only producer of bayonet brass caps for GLS lamps. It also manufactures outer tubes for fluorescent lamps and small quantities of lead glass tubes for flanges. The total paid-up capital is Rs. 50 lakhs and it has a net capital block of Rs. 57.44 lakhs. Its employed capital in 1960 was Rs. 90.81 lakhs and the value of its net sales was Rs. 90.27 lakhs. This unit along with the previous one called as the ELMI-Hind group accounted in 1961 for 61 per cent of the total production of GLS and allied lamps. 50 per cent of the production of miniature lamps and as much as 97 per cent of the total production of fluorescent tubes in the industry. In respect of components manufacture they have at present a monopoly of the production of brass caps and outer glass tubes for fluorescent lamps. They also control about 90 per cent of the production of glass shells for GLS lamps.

4.3.3. *Philips India Ltd., Calcutta.*—This company is a constituent of ELMI, some of its shares being held by Midland Bank Executors. The parent company is the collaborator for both ELMI and Hind and has also taken over the factory of Osler Electric Lamp Manufacturing Co. of Bombay where at present only GLS lamps are manufactured by it since February 1962.

4.3.4. *Bengal Electric Lamp Works Ltd., Calcutta.*—This company, a pioneer in the production of electric lamps in the country, has a paid-up capital of Rs. 23.16 lakhs, a net block of Rs. 16.27 lakhs and an employed capital of Rs. 38.43 lakhs. It manufactures GLS lamps and also a certain proportion of its requirements of glass shells. The value of its net sales in 1960 was Rs. 60.13 lakhs. Its expansion plan to augment the capacity of GLS lamps by 2 million lamps is now complete.

4.3.5. *Bharat Electrical Industries Ltd., Calcutta.*—This is a public limited company with a paid-up capital of Rs. 11.26 lakhs. It commenced production in 1947 and manufactures GLS and other allied lamps. It has a net block of Rs. 17.23 lakhs and employed capital of Rs. 24.13 lakhs. Its net sales were of the value of Rs. 43.93 lakhs in 1960. It has already completed its expansion programme for raising the output of GLS lamps by 2 million lamps.

4.3.6. *Mysore Lamp Works Ltd., Bangalore.*—This unit is a public limited company with a paid-up capital of Rs. 8 lakhs. The Government of Mysore owns about 44.5 per cent of the paid-up capital of the company. Its net capital block is Rs. 5.11 lakhs and its employed capital is Rs. 21.88 lakhs. It commenced production in 1937 and manufactures GLS and other allied lamps. The value of its net sales was Rs. 22.19 lakhs in 1960. It has plans for substantially expanding and diversifying its capacity which includes manufacture of miniature bulbs, fluorescent tubes and glass shells for GLS lamps in excess of its own requirements. It has secured collaboration of International General Electric Co. of U.S.A.

4.3.7. *Other units in organised sector.*—Besides the above, there are about twelve other medium-sized units in the organised sector engaged in the production of electric lamps. Out of these, data for ten units are available in respect of their capital employed and output. The total net capital block of these units is Rs. 59.04 lakhs which forms 28.5 per cent of the total net capital block of the industry. The capital employed among them is Rs. 29.71 lakhs. It forms 10.9 per cent of the total capital employed in the industry. The value of their net sales in 1960 was Rs. 67.59 lakhs which formed 16 per cent of the total net sales of electric lamps in the country. These figures indicate that they are together responsible for a small proportion of the capital investment and the output of the industry.

4.3.8. *Small-scale sector.*—In the small-scale sector there are sixteen units manufacturing mainly miniature lamps. Most of them are partnership or proprietory concerns and have commenced production only recently. Among them data for about thirteen units are available regarding capacity and production. They have together a capacity of 23.87 million lamps, but the actual production seems to be very much lower, being reported at as low a figure as 2.13 millions for eight units in 1961. While it appears that unduly high figures of capacity have been reported there is also much under utilisation of capacity among the small units.

5. Organisation and structure of the industry.

5.1. *Organisation.*

5.1.1. The industry is broadly divided into two sectors, namely, the large-scale and the small-scale sectors. The units in the small-scale sector are essentially interested in the manufacture of miniature lamps. The large scale sector consists of two segments comprising ELMI-Hind group and the ILFA group. The constituents of the ELMI-Hind group are the Electric Lamp Manufacturers' (India) Pvt. Ltd. and the Hind Lamps Ltd., Philips (India) Ltd. also belongs to this group in view of its close association with their policies. The term ILFA stands for the Indian Lamp Factories Association which is an organisation set up by those manufacturing units which are outside the first group.

5.1.2. *ELMI-Hind group.*

5.1.2.1. The two establishments in the ELMI-Hind group are self-contained units producing as many of the main components as possible within their own organisation. They are also complementary to each other making the group independent as far as possible. They have a common parentage as they have been set up by foreign manufacturing agencies. The object of such financial collaboration seems to be to produce within the country in a central manufacturing concern electric lamps which were previously imported by them from their respective manufacturing concerns for sale in the country. Their organisational pattern though ostensibly similar to that of ELMA, the corresponding group in the U.K. which was investigated by Monopolies Commission, avoids the criticism of being a cartel of producers, since the several selling organisations are the sole shareholders of the manufacturing company. Nevertheless, being the largest single producer at present they have not been able to avoid being described as occupying a virtual monopoly position in the industry. They manufacture identical products and their offtake is by their parent companies through their selling organisations within the country. The ELMI-Hind group has also undertaken the production of components required for the industry, such as shells and brass caps not only for its own requirements but also for sale to the units in the ILFA group. Components are accounted for and distributed separately through a factory sales department.

5.1.2.2. The economic features of this organisation are mass production of identical products and segregated distribution by the selling organisations of the parent companies in the country. The underlying motive of such an arrangement is to sustain the brand name of their previously imported lamps for sale in the country. In other words the goodwill established by the former importers is maintained by the sale of internally produced lamps under the old brand names. The process of segregation for this purpose is done even at the manufacturing stage when the old brand names are stamped on the products, which cannot otherwise be differentiated technically as they are identical in all respects. Philips India Ltd. manufactures lamps under its own name besides what is made by the ELMI-Hind group under its trade name. The offtake of the output is in proportion to the financial contribution of the parent companies in the ELMI-Hind units. It seems apparent, looking at the financial results of the manufacturing units in the group and the considerable margin between factory selling prices and ultimate prices charged by distributors, that the greater profitability of the distribution line has generated the present organisational pattern.

5.1.2.3. The ELMI-Hind group, besides making a sizable contribution to the total output of electric lamps and fluorescent tubes in the country, is also responsible for practically the entire output of components made in the country. The rest of the industry is in fact at present dependent on the ELMI-Hind group for these components. This need not be considered as a peculiar phenomenon in this country giving rise to any alarm. In the United Kingdom also the Electrical Lamp Manufacturers' Association (ELMA) produces the components and supplies them to the independent producers who are outside this organisation. Since it is uneconomic to instal components manufacturing plants by each individual producer they have per force to depend upon a large organisation which can afford to instal such plants. The ELMI-Hind group has still considerable unutilised capacity as it operates only one shift for GLS lamps. It is a matter for consideration whether this group would be in a position to supply components to independent producers when at any future time it is enabled to operate multiple shifts. It has obtained a licence for expansion of production of components but has been denied expansion of production of lamps and has represented that it is unable even to get an import licence for implementing even the first scheme, which would have helped to ensure greater availability of components for increased production by existing units which are at present restricted to single shift working.

5.1.3. *ILFA group.*

5.1.3.1. The ILFA group is an association of medium sized manufacturing units, which are financially independent of each other and separately market their products under individual trade names. None of them (except Bengal Lamps) was so far large enough to instal plants of a minimum economic size for the manufacture of components. Thus they are not self-contained units and depend on the ELMI-Hind group for the supply of main components for GLS lamps such as shells and brass caps.

5.1.3.2. The ILFA association is not to be compared to a trust or a cartel form of business combination. It is a form a gentlemen's agreement in respect of the ceiling prices to be charged for the products manufactured by them. It is essentially an organisation to prevent inter-firm price competition. It may be correctly described as a form of defence mechanism against its common rival the ELMI-Hind group.

The ILFA association prescribes common prices following the lead of the ELMI-Hind group and because of the competition between them there is really no trade monopoly. The units in the ILFA group, though relatively less economical, are sustained by their smaller overhead charges. The general shortage of lamps in the market enables the retail price levels to be maintained as set by the selling organisations of the ELMI-Hind group. The production control exercised by the Government through import licence is also in their favour as the potential giants are not allowed to grow and swamp them out. There is also play of sentiment in sustaining them, as in some cases the areas to which they belong extend local patronage to their products resulting thereby in a sort of a natural market demarcation.

5.1.3.3. The ratio of their output to the total production though individually small is not insignificant when the whole of the ILFA group is taken together. It is, however, very doubtful whether the ILFA units have any excess capacity which if pressed into service would reduce the unit cost of production. Though some units of the group who are expanding and machanising their plants could reduce their costs by operating a second shift, the others who are still uneconomic in their size and inefficient in respect of their equipment may hardly be able to reduce their unit cost of production even if permitted to operate more than one shift. Their overheads being already low its distribution over a larger output would not result in reducing the cost of production appreciably.

5.2. *Industrial structure—Concept of optimum.*

5.2.1. The concept of the optimum size in respect of lamp manufacturing plants which should normally be considered when licensing units is of significance as any attempt to make lamps cheaper by a reduction of costs would be possible only through an approximation of the manufacturing units towards the optimum size. In defining the concept two factors, technical and managerial would be relevant. The manufacturing equipment for the GLS lamps consists of a production line or chain of machinery which is either fully or partially automatic. The average capacity for GLS lamps of such a line is estimated by the Panel appointed by the Development Council to be 3 million pieces per annum working on a single shift. Representatives of producers at the public inquiry agreed with the above chain capacity, which may, therefore, be considered as the technical optimum. In the case of fluorescent tubes it was understood that the corresponding optimum would be about 1 to 1.5 million tubes per annum working on single shift. But these may not coincide with the optima in terms of managerial and other factors such as common services, maintenance, etc. The cost of efficient management and common services cannot be borne by a plant consisting of a single line equipment. Further it is desirable to have continuity of production and at the same time ensure proper maintenance involving periodical overhaul of plant and machinery which is possible only by having more than one production line. Another advantage in this case is that a major part of the plant can be kept on long runs for production without the necessity of frequent change-over from one size to another thus deriving the economies of standardised repetitive processes. Consequently, a duplication of the lines of production becomes necessary. A manufacturing establishment may have two, three or more lines of plant according to its managerial organisation. The maximum internal limit to an expansion in plant capacity would be determined only by the managerial ability to control the establishment and the setting in of diseconomies of co-ordination. There may also be certain external limits of such an expansion imposed by the shortage of foreign exchange for acquiring imported raw material and components and by market limitations within the country. On account of both capital and market limitations we do not foresee the establishment in India of such giant size plants with very high speed and complete automation as is common in U.S.A. and Europe.

5.2.2. There is also scope for some degree of integration within the industry, to be secured by the manufacture of components within the establishment. The ELMI-Hind group have attempted such an integration. Since the minimum operational economic size of a component plant is large, the output may prove to be higher than what is required internally. The capital investment on a large size component plant for example for manufacture of glass shells is relatively higher than for a unit assembling components only and its profit margin is also apt, to be lower. Particularly in the context of single shift operations for GLS lamps, the ELMI-Hind group are facing this situation The matching of output and its offtake in respect of the components would depend upon the programme of operation within the structure.

5.2.3. According to the present dispensation there exists a considerable amount of excess capacity for lamps as the industry has had to operate only one shift for GLS lamps. To make up a shortfall in supply new units are being licensed for operation on a single shift basis. Old units which are relatively uneconomic are also allowed to continue in existence on the basis of single shift operation. The present demand is thus being met on a broad-based single shift operation. This has resulted in the non-utilisation of existing capacity particularly with units like ELMI-Hind who have more automatic and economic lines of production but are not enabled to achieve economy of size and modern equipment. The background to this policy perhaps stems from extra-economic considerations.

5.2.4. The medium sized units as described in paragraph 4.3.7 are generally below the optimum size. They generally do not have several chains of production, but work a few of each type of machinery in batches. The machinery except those recently acquired are not fully automatic and in some cases are old and outdated. The mounting of filaments is generally done by hand and there is considerable cross movement of processed components which would be avoided in a chain line of production. Such operation has been found feasible financially only because the overheads of these units are not large. The rate of output in such units is naturally lower and the quality in some cases is also poorer. Such a pattern of industrial structure has been possible as certain economies of scale are reached quickly in the industry and there are no compelling factors to increase the size any further if only the managerial factor could be kept at a minimum. Survival of small and less efficient units has been rendered possible by small technical optimum in the industry. Low operating cost has not been a determinant of existence because of short supply conditions and the absence of real competition.

6. Estimates of demand.

6.1. The future demand for electric lamps is estimated to rise significantly. The Development Council for Light Electrical Industries estimates that the demand for GLS and other lamps would rise to 80 millions in 1965-66 as compared to 49 millions in 1961-62. The demand for fluorescent lamps is expected to be of the order of 8 millions in 1965-66 as compared to 3.5 millions in 1961-62. In respect of miniature lamps the demand during 1960-61 was 30 million pieces which is expected to rise to 50 millions in 1965-66. Demand for photoflash lamps and gaseous discharge lamps (high pressure mercury vapour) is expected to be 6 millions and 0.3 million pieces respectively by 1965-66. The Development Council has further recommended that the target for exports should be taken as 10 per cent of the estimates of internal demand. Thus the production targets for the year 1965-66 would be 88 millions for GLS and other lamps, 8.8 millions for fluorescent tubes and 55 millions for miniature lamps. The Development Council has adopted an annual rate of increase of 12.5 per cent in the case of GLS lamps. For fluorescent tubes the increase has been taken at the rate of 15 per cent for the first three years and 20 per cent for the next two years. The above estimates, which we understood had to be raised, were discussed at the public inquiry. After a careful examination of all the evidence available with us we have come to the conclusion that the annual rate of increase of 12.5 per cent assumed by Development Council for GLS and allied lamps is rather on low side. The average annual rate of increase in the availability of these lamps during the last four years was more than 14 per cent. After taking into consideration the schemes of power generation during the Third Plan and schemes of rural electrification we estimate that the average annual rate of increase in demand for GLS and other allied lamps will be of the order of 15 per cent during the next five years. On this basis the domestic demand for GLS and other allied lamps works out to 86 millions in 1965-66. After taking into account exports requirement at the rate of 10 per cent, the total demand for GLS and other allied lamps will be 95 millions for 1965-66. The estimates of demand for fluorescent tubes and miniature lamps prepared by Development Council appear to be reasonable.

6.2. There has already been a shortage of lamps in relation to the estimated demand for 1961-62. The estimated demand for GLS lamps was 49 millions but the availability was only 45 millions, a shortfall of 8 per cent. As regards fluorescent tubes, while the estimated demand for 1961-62 was 3.5 millions the availability was limited to 2.1 millions, the shortfall being as much as 40 per cent. There is, therefore, a compelling necessity to increase the output of GLS lamps and fluorescent tubes in the country. Additional capacity has been licensed for the future to meet the estimated rise in demand. For GLS lamps the additional licensed capacity is for 19.46 millions making a total capacity of 82.06 millions in the country. This is on the basis of single shift operation and falls short of the estimated demand of 95 millions for 1965-66. There is, therefore, a case for double shift operation at least in some of the efficient units. For fluorescent tubes additional capacity of 8.29 millions has been sanctioned for the future making a total of 11.59 millions including the existing capacity. This exceeds the estimated demand of 8.80 millions. For miniature lamps an additional capacity for 34.45 millions has been licensed. Inclusive of existing capacity it will make a total of 63.20 millions for the future which would exceed the estimated demand of 55 millions. If the vicious circle of low output, scarcity and high cost is to be broken, the policy of licensing new capacity on a single shift basis for meeting the future estimated increase in demand would require re-examination. Installation of new equipment, while excess and unutilised capacity exists in several units in the industry, would result in avoidable strain on capital resources and foreign exchange. Conservation of foreign exchange to meet the demand for the import of certain essential components such as lead-in-wires, molybdenum support wires, tungsten filament, etc., which are not manufactured within the country, is unavoidable. At the same time greater emphasis is needed for augmenting or establishing the capacity for components. If reduction of prices of electric lamps in the country is an ultimate objective, a slight revision of the present policy seems to be necessary since economies of operation can only be obtained by multiple shift working in plants which have costly automatic equipment.

7. Manufacture.

7.1. *Process of manufacture.*—The incadescent lamp consists of a resistance wire called filament hermetically sealed in a glass bulb which is either evacuated or filled with an inert gas. The main parts of an electric lamps are a filament, filament support, lead-in-wires, stem, glass shell and a cap. The main process of manufacture along with some of the salient features of an electric lamp is given in a technical note in Appendix VI.

7.2. *Raw materials and components.*

7.2.1. The principal components of incandescent lamps are caps, glass shells, glass rods and tubing for stem and exhaust, molybdenum wires for support, tungsten wires for filament, lead-in-wires, nitrogen and argon gases, and for fluorescent tubes and discharge lamps, fluorescent powder and quartz burners.

7.2.2. Except glass shells and caps for GLS lamps, glass tubes for fluorescent lamps and small quantities of glass tubes stem and gases, the other raw materials and components are being imported at present. In the case of GLS lamps glass shells and brass caps are the components which account for the main element of cost, the imported components being estimated to cost on an average not more than 7 nP. per lamp. In the case of fluorescent tubes the estimated cost of components imported average about 47 P. per piece. Attempts are now being made to produce more components within the country such as lead glass tubes for flange caps, cement, etc. Three units have been licensed for manufacture of a critical part, namely, tungsten wire. It has been laid down as a condition of licensing expansion and setting up of new units, that they cannot import glass shells and tubes but should either produce them or must make use of indigenous production. Glass shells are at present manufactured by ELMI-Hind units and Bengal Lamp Works Only the former, who are working their components plant to capacity and have quantities in excess of their present requirements on single shift capacity for GLS lamps, have shells for distribution to others. which is to their mutual advantage. Till recently Hind Lamps was the sole producer of brass caps (bayonet type) and it has been supplying to others after meeting requirements of its own. A new unit, S. V. Subramaniam & Sons, Bangalore, has come up solely as a producer of components with a capacity for 15 million caps, while two other units, R. S. Traders, Bombay and Lamp Caps (Pvt.) Ltd., Bombay have yet to utilise their industrial licence for all types of caps including bayonet, screw and miniature types. Since there are chronic complaints that producers of lamp components cannot meet satisfactorily the needs of smaller units, who are competitors, it is a desirable trend that special component manufacturing units are being set up. A similar development in respect of glass shells also is urgently needed. ELMI-Hind have a small spare capacity in their vertical tube drawing machines which is being utilised to step up the production of lead glass tubes for flanges. With the significant rise in demand for fluorescent tubes which is projected, a much larger capacity for outer tubes would be required to meet the production of fluorescent tubes. Some other producers also like Pradip Lamps, S. V. Subramaniam & Sons, Laxman Engineering Industries Ltd. and Mysore Lamp Works have been granted licences for production of shells and tubes. A list of producers of components who have been licensed is given in Appendix VII.

7.2.3. S. V. Subramaniam & Sons have also started making caps as an experiment out of aluminium strips instead of brass strips. We were, however, told that the aluminium alloy needed for rolling strips is at present not produced by the aluminium manufacturers in the country. The representatives of ELMI and Hind stated that substitution of aluminium caps will slow down machine working and to that extent somewhat offset the cheapness of aluminium as a metal. In the context of restricted availability of brass strips which depends on imports of copper and zinc entailing foreign exchange, the use of aluminium might ultimately prove more economical and desirable all round and should be encouraged.

7.3. *Miniature lamps.*

7.3.1. As the name indicates these lamps are of small size and normally of low voltages and wattages. They are meant for torches, radio dials, telephone switch boards, automobiles, etc. The process of manufacture is generally on the lines of vacuum lamps. Some of the lamps like auto-head lamps which are comparatively of higher wattages are gas filled. The present output seems to be adequate for the existing demand. The estimate of demand for 1961-62 on the basis of 30 millions for 1960-61 and 55 millions for 1965-66 was approximately 34 millions and as against this the availability was about 38 millions. The estimated demand for the future according to the Development Council for Light Electrical Industries is 55 millions and the licensed capacity for the future is 63.20 millions. As such there is no shortage now and there is not likely to be any shortfall of supply even in the future.

7.3.2. In respect of raw materials and components, miniature lamps depend to a greater extent on imports than GLS lamps. Shells of miniature lamps of smaller size are blown from imported tubes whereas those for large sized lamps are imported. Shells are blown by miniature lamp producers themselves with imported tubes. At present brass caps for miniature lamps are being imported. Therefore the import content of miniature lamps is relatively greater at present. The relatively greater dependence on imports for components may perhaps be one of the reasons for the small and medium sized manufacturing units holding their own in this field as against the large-scale establishments.

7.3.3. Miniature lamps are produced both by exclusive producers in the medium and small-scale sector and also by general producers in the large and medium-scale sectors. But the general producers, particularly the large-scale establishments, take up only those types of miniature lamps which are required in large quantities and hence amenable to mass production. Miniature lamps for torches for instance are made by large concerns like the ELMI and Hind, because their production can be on a large scale, whereas among miniature lamps, those meant for automobiles, which are of innumerable varieties are not amenable to mass production. They are, therefore, not taken up by the large establishments. Small units particularly in the small-scale sector produce each of the varieties in small quantities. It is not uneconomic for them to do so. Under the circumstances a comparison of their costs of production among large and small units is not relevant. Economies of large-scale production are not available in the case of those miniature lamps which have to be produced in small quantities to meet special demands. As a matter of policy, therefore, small units may be encouraged to develop the manufacture of miniature lamps which cannot be standardised on the production side in view of their smaller or specialised demand. To reduce dependence on imports the manufacture of glass tubes for blowing miniature shells and caps for miniature lamps needs to be encouraged.

7.3.4. Large manufacturing establishments engaged essentially in the production of GLS lamps take up the manufacture of miniature lamps for diversification of their production. Overhead expenses may get distributed over these items also in a large concern if such production is undertaken. However, extreme diversification of production for an average size producer does not seem to be fully justified. By limiting the range of production greater efficiency and economy can be secured, the benefit of which should be shared with the consumers.

7.3.5. Among miniature lamps there is a special item known as photo-flash lamp. Unlike other miniature lamps it does not belong to the incandescent variety. It is produced in the country only by Pradip Lamp Works, though some other units have also been licensed.

7.4. *Special lamps.*—Special types of lamps which are important for diversification of production are high pressure mercury vapour discharge lamps. They are produced in small quantities by ELMI, Pradip and B. Chowdhury & Co. The last company, which is manufacturing these lamps exclusively, has been costed in connection with our inquiry. These lamps are generally purchased by institutions like municipalities for street lighting purposes, railways for illuminating their yards or by industrial establishments for lighting their workshops and yards. In their case too significant economy can be achieved only if indigenous production of silica burners, for which licences have been issued, is established. Manufacture of shells needed for these will also help to bring down costs.

7.5. *Quality.*—I.S.I. specifications are so far laid down for tungsten filament GLS lamps and lamps for railway rolling stock, bayonet lamp holders and glass bulbs for lamps. Some more standards are under preparation. It is claimed by the producers that the quality of their products conforms to these standards. For products for which I.S.I. standards are not available British or International standards are followed by the producers. The certification marks scheme has not been adopted by any of the producers. ELMI, Hind and Philips, whose products under the brands of their collaborating companies are already well-known in the country, do not see any further advantage in subscribing to I.S.I. marks. Bharat Electrical Industries has stated that the very fact that its products are approved by the Director-General of Supplies and Disposals shows that it conforms to set standards and it does not like to increase its cost by subscribing to certification marks scheme. This would also reflect the opinion of other producers in the ILFA group. Under conditions of shortage when producers are not experiencing any difficulty in selling their products no advantage seems to be offered by their subscribing to I.S.I. certification marks scheme. In respect of the average life of an electric lamp, International standards are observed. It is claimed in respect of GLS lamps that the normal expectation of life extending over 1000 hours is being reached by the producers. Consumers, however, are not fully satisfied in respect of the quality of the lamps produced in the country. The complaints are particularly emphatic in respect of the lamps supplied by some of the units that are outside the ELMI-Hind group. It is needless to repeat that indigenous producers should become quality conscious. While prices are relatively higher if even certain standards of quality are not maintained the consumers would be unjustifiably hurt. A strict adherence to standards laid down and the setting up of facilities for testing the quality of the lamps ought to be made a condition precedent to further expansion of production in any plant. Quality has particularly to be maintained if export markets have to be developed for which some scope exists if prices can be quoted at international market levels.

8. Imports and exports.

8.1. *Imports.*—There has been no quota for established importers for GLS lamps and fluorescent tubes since the April-September 1958 licensing period. However, the limited imports of certain special varieties like studio and projector lamps, sealed beam units and pre-focussed types of lamps have been considered on an *ad hoc* basis. The total value of such imports has steadily fallen from Rs. 63.9 lakhs in 1957 to Rs. 34.1 lakhs in 1961.

8.2. *Exports:*

8.2.1. Exports of all types of lamps have risen from the aggregate of 13,071 pieces of the value of Rs. 26,556 in 1957 to 419,092 pieces of the value of Rs. 2,16,266 in 1961. The exports are mainly in GLS lamps and fluorescent tubes and directed to South East Asia and Middle East countries. ELMI-Hind have formed an export organisation called Allied Lamp Exporters for handling all export activities. In contrast, the exports of other producers are insignificant. Despite the refund of customs duty and excise on raw materials, stores, etc. used in lamp manufacture for export, and an additional import entitlement on the basis of 60 per cent of f.o.b. value of exports producers have represented that they are not able to improve their export performance. According to them, the average selling price in India is Re. 1 per lamp as against 40 P. or less which is the equivalent value in overseas markets. One producer has stated an instance that for a 60 watt GLS lamp, its c.i.f. selling price in overseas market is approximately Rs. 35 per 100 lamps as compared to direct factory cost of approximately Rs. 70 per 100 lamps, excluding overhead, selling expenses and after taking credit for refund of Rs. 10 (excise duty). Our cost figures would show that the difference between producers' costs and export prices would be negligible if full rebate is allowed of all the excise and import duties on components so that the present incentives seem to be adequate for exports. There is scope for exports to South East Asia and Middle East countries particularly by some of the lower cost units who also maintain standards of quality. It seems likely that the disparity on account of the present high domestic prices may weigh with many potential exporters, in a situation of shortage, as probably a disincentive. For augmenting exports the internal output must also be raised bringing down costs, and further progress must be made in the manufacture of components within the country.

8.2.2. Even if it means anticipating later discussions, we would state that the above conclusions were amply borne out by our examination of the cost of GLS lamps manufactured by ELMI. These costs including the cost of shells are the lowest amongst the indigenous producers and the prices based thereon would compare favourably with prices in world markets mentioned by the industry as well as the domestic prices of overseas manufacturers. If as recommended, ELMI and Hind are permitted facilities for working one or more of its automatic lines with second shift, their costs would go down further. It may in all the circumstances, considering ELMI's and Hind's advantages arising from a common price in the domestic market, work out that grant of additional exchange for import of raw materials for working second shift should justifiably be tied up with an obligation to export. This will be a responsibility which ELMI and Hind will be well fitted to discharge since the quality of their products—even their packing—are, on their showing, up to international market standards.

9. Problems of the industry.

9.1. From the preceding description of the organisational structure and the performance of the industry it should be obvious that the main problem seems to be an overall deficiency of supply of electric lamps in the country. The deficiency is not only in respect of GLS lamps but particularly so in respect of fluorescent tubes. Industrial as well as domestic demand has been on the high side for fluorescent tubes during recent years. In respect of GLS lamps periodic variation in demand in favour of either low or high wattage lamps has been reported. At one time the shortage of low wattage lamps was more acute. At present the shortage is reported to be more pronounced in case of 40 and 60 watt lamps. Left to the normal processes of demand the increase in favour of high wattage lamps is bound to persist as it is a reflection of the rise in national income and the consequent improved conditions of living of the masses of the consumers. But there is also reason to believe that the consumer demand is being artificially channelled towards high wattage lamps as the existing price differentials not justified fully by manufacturing costs, offer a higher margin not only to trade but also to industry. It is not desirable to permit an incentive for such artificial diversion of demand.

9.2.1. The present high prices of lamps are due mainly to shortage in production and restricted output of even those who can economise by enlarging production and by reducing high distribution costs. To meet the shortfall in supply which is the primary cause and for bringing down the prices of lamps there is no alternative to an all-round increase in output. Capacity for raising output already exists in the industry but is mainly confined to automatised units like the ELMI-Hind group. To press into service such excess capacity with maximum efficiency and economy, the selection of units like the ELMI-Hind group would be more appropriate. Though the entire industry is now operating on a single shift basis potential capacity consistent with economic operation exists more with units in the ELMI-Hind group having more than one production chain, whose operational efficiency is high and whose working multiple shift even partially will help to bring down overheads which are substantial. While the others could also operate for a second shift the resulting economies in the operation may not be perceptible as the degree of automation among them is less and their overheads for distribution over a larger output are not sizeable. Policy decisions have not been apparently easy in this respect as conflicting claims appear to cloud the issues. Apart from considerations of decentralisation, a dilemma is posed of licensing new capacity in the medium scale group as against operating extra shifts in the large-scale sector. Despite its being for all purposes an Indian company the extent of foreign interest in ELMI-Hind group and their command of over 60 per cent of output in the industry has caused apprehension among smaller units that optimum working and low cost of ELMI would squeeze them out. Whether both sections of the industry should be encouraged to develop, whether the organised or the decentralised sector of the industry should be encouraged to determine the future pattern of the industry or whether large *versus* medium sized units deserve encouragement are thus alternatives which are not easy to choose.

9.2.2. However difficult the solution may be, an increase of supply of electric lamps not only during the short period but certainly in the long run is a compelling necessity. What the authorities have to decide is whether such augmentation of supply should be secured economically or with the least dislocation to existing units. In other words, the main alternatives are manufacturing costs and social costs. If the manufacturing costs are to be brought down to their lowest level, the more efficient units have to be given an opportunity to operate to a fuller extent of their capacity. If social costs are to be reckoned, there should be a sacrifice of economy and postponement of the possibility of reducing the prices of electric lamps in the country. If in the name of social costs, some of the uneconomic units have to be fostered and their existence perpetuated there will arise a class of non-competing groups claiming eternal protection against the march of technological progress. If the purpose of this inquiry is to suggest ways and means of reducing the cost of production of electric lamps in the country for making it available to the local consumer at reasonable prices and also for export to foreign markets, then there is no alternative to the choice of efficiency as the guiding principle for the reorganisation of the industry. So long as there is no anti-social activity by any producing group within the country, efficiency that exists with them should be utilised for the benefit of the nation.

9.2.3. So far as it could be visualised from a study of the existing structure of the industry the only suggestion which is capable of meeting the present impasse is to permit second shift operation for GLS lamps in the ELMI-Hind group. It is apprehended that a full second shift operation by the ELMI-Hind group may swamp the market and leave very little opportunity for the ILFA group producers to survive. Since the ELMI-Hind group is already meeting about 60 per cent of the demand they could perhaps meet the entire demand of the country, with a second shift operation. We are conscious of this line of argument and we, therefore, recommend that as a first measure for stepping up production in the short period and bringing down costs one of their automatic lines engaged in the production of GLS lamps may be enabled to operate a second shift. Gradually as the demand increases the other lines may also be pressed into service on a phased basis. Similarly, some additional foreign exchange for maintenance imports should also be given for other units which have already installed modern automatic equipment and can work partially a second shift. This will help to raise production during the short period when effective steps should be ensured for stepping up more production of essential components like glass shells, tubes and caps. Acceptance of this suggestion would automatically obviate the licensing of any new capacity intended for single shift operation which is promoting cause of high costs. It should be obvious that the implementation of this recommendation would mean a saving in foreign exchange which may otherwise be required for the installation of new plants. It would be unwise to fritter away scarce foreign exchange for the installation of new plants when efficient plants already exist in the country and which are not fully utilised. This suggestion does not, however, mean that less efficient firms in the medium scale sector would be left to shift for themselves. There are other ways of sustaining them as long as they need to be sustained. A quota of institutional purchases may be made out of their output. Local demand may also be in their favour. They may be able to survive even in the context of a cut in prices and competition with large scale producers as their capital costs and operating expenses especially overheads are apt to be lower.

10. Cost of production—Actuals.

10.1.1. In paragraph 3.2 we have discussed the sample selected for cost examination. The actual costs were checked for the following companies for their output of lamps as indicated in their accounts for the periods mentioned.

Name of the company	Period for which costed
1. Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta.	Year ending 30-6-1962.
2. Pradip Lamp Works, Patna . . .	Year ending 30-9-1962.
3. Mysore Lamp Works Ltd., Bangalore .	Year ending 31-3-1962.
4. B. Chowdhury & Co., Bombay . . .	Year ending 30-6-1962.
5. Sunder & Kapoor, Bombay . . .	1-4-1962 to 30-9-1962.

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Out of the above units, ELMI, Pradip Lamps and Mysore Lamps manufactured GLS lamps; ELMI and Pradip Lamps produced fluorescent tubes; ELMI, Pradip Lamps and Chowdhury made high pressure mercury vapour lamps and ELMI, Pradip Lamps and Sunder & Kapoor made miniature lamps. Our Cost Accounts Officers' Reports are being forwarded to Government as confidential enclosures to this Report.

10.1.2. ELMI follows a system of standard costs with budgetary control which enabled our Cost Accounts Officer to arrive at the actual costs with a reasonable degree of accuracy. As regards Mysore Lamps, reasonable estimates of raw material requirements and labour charges for different products were available on the basis of which the total expenses could be allocated to the different kinds of GLS lamps. The other units do not maintain their records in a manner which would help cost data to be extracted readily for different items. Therefore their expenses have first been allocated to the various departments and the actual costs for the different products were estimated on the basis of available data.

10.1.3. For GLS lamps up to 300 watts, unit A operates four automatic lines out of which one line being old runs at a comparatively low speed with consequent increase in costs of conversion. For the actual costed period weighted average costs have been worked out for those items which are produced both on the slow and the high speed lines. These have, however, been adjusted for making future estimates for price fixation.

10.2.1. Of the costed units, unit A produces its own glass shells for GLS lamps. It has also a surplus of glass shells available for sale (as is the case with its sister concern). While the shells sold are mainly hand blown like that of other indigenous producers, the shells consumed for its own production are mostly machine blown. Despite higher material usage, relative economy in machine blowing is considerable. While the average actual cost of hand blown shells was Rs. 85.91 per 1000, that for the machine blown was Rs. 53.27 per 1000. Unit A also produces tubes for its fluorescent tubes while unit B, which has licence for its production, imports them.

10.2.2. It was observed in the case of unit A during the costed period that for the bulb of the standard range of GLS lamps, the proportion of imported materials and components varied between 39 per cent and 61 per cent, or on the average about 46 per cent of the total cost of materials excluding glass shells. The average value of such components worked to about 7 P. per lamp. Only for certain small ranges of output (including high wattage lamps) was the value of the imported components considerable. In the case of fluorescent tubes the proportion of imported components and materials represented about 97.5 per cent of the total cost of materials excluding only glass tubes, the average value being about 47 P. per lamp. Unit A, however, has plans to produce flange tubes for the standard types of GLS lamps and caps for fluorescent tubes. This will reduce the proportions of imported components to 38 per cent for GLS lamps and to 61 per cent for fluorescent tubes, whose average value would be about 6 P. and 32 P. respectively per lamp.

10.2.3. As far as conversion costs are concerned, labour and establishment, power and fuel, consumable stores and repairs and maintenance have been allocated by departments. Depreciation was calculated at usual income-tax rates. Due to the peculiar selling/distribution arrangement of unit A and its sister concern and the practice of fixing prices on a common destination basis certain adjustments have to be made (as will be explained later) in regard to unit A's costs, before averaging it on a common basis with that of other costed units for determining future prices.

10.2.4. It would be unwieldy to tabulate the actual costs for each of the very large number of kinds and wattages of incandescent and fluorescent lamps manufactured by each company. The following comparative tables, therefore, only illustrate the actual costs for a few typical cases so as to give an idea of the variations in costs from unit to unit as well as according to wattage.

TABLE I(a)

Comparative statement of actual ex-factory costs of G. L. S. (other than high wattage) lamps.

(Rs. per 100 lamps.)

Unit	15 Watt (55 m.m. vacuum clear)			25 Watt (60 m.m. vacuum clear)			40 Watt (60 m.m. G. F. clear)		
	A	B	C	A	B	C	A	B	C
Material costs									
Cost of shells	6·59	16·31	13·74	6·72	17·31	14·58	6·72	17·31	14·58
Cost of caps	7·63	7·40	7·55	7·63	7·40	7·55	7·80	7·40	7·55
Other material cost	5·97	5·17	5·04	6·31	5·58	5·44	7·15	6·56	6·39
TOTAL MATERIAL COSTS	20·19	28·88	26·33	20·66	30·29	27·57	21·67	31·27	28·52
Primary packing material cost	4·02	4·90	3·10	5·35	5·85	3·10	5·35	5·85	3·10
Conversion cost	9·00	18·67	17·55	9·17	18·67	17·55	10·15	18·67	17·55
Packing for despatch	2·86	3·30	2·01	3·80	3·30	2·01	3·80	3·63	2·01
TOTAL	36·07	55·75	48·99	38·98	58·11	50·23	40·97	59·42	51·18
Selling expenses excluding freight outward	..	2·88	4·41	..	3·00	4·41	..	3·07	4·41
TOTAL	36·07	58·63	53·40	38·98	61·11	54·64	40·97	62·49	55·59
Royalty 2% of net sales rate	..	1·42	..	..	1·42	..	..	1·58	..
TOTAL EX-FACTORY COST	36·07	60·05	53·40	38·98	62·53	54·64	40·97	64·07	55·59

Unit	60 Watt (60 m.m. G. F. Clear)			100 Watt			Train Lighting (50 m.m.)		
	A	B	C	A	B	C	A	B	C
				(60 m.m.)	(70 m.m.)	(70 m.m.)			
Material Cost :									
Cost of shells	6·72	17·31	14·58	6·72	21·00	17·72	9·30	15·86	13·33
Cost of caps	7·80	7·40	7·55	7·80	7·40	7·55	7·63	7·40	6·10
Other material cost	7·42	7·82	7·93	9·22	10·27	11·03	6·85	6·28	6·64
TOTAL MATERIAL COST	21·94	32·53	30·06	23·74	38·67	36·30	23·78	29·54	26·07
Primary packing material cost	5·35	5·85	3·10	5·35	8·05	5·00	3·00	3·25	3·10
Conversion cost	10·15	18·67	17·55	10·36	18·67	17·55	16·56	18·67	17·55
Packing for despatch	3·80	3·84	2·01	3·80	5·18	4·36	1·73	3·72	2·01
TOTAL	41·24	60·89	52·72	43·25	70·57	63·21	45·07	55·18	48·73
Selling expenses excluding freight outward	..	3·14	4·41	..	3·64	4·41	..	2·85	4·41
TOTAL	41·24	64·03	57·13	43·25	74·21	67·62	45·07	58·03	53·14
Royalty 2% of net sales rate	..	1·68	..	..	2·26	..	..	1·62	..
TOTAL EX-FACTORY COST	41·24	65·71	57·13	43·25	76·47	67·62	45·07	59·65	53·14

TABLE I(b)

Comparative statement of actual ex-factory costs of G. L. S. High wattage lamps.

(Rs. per 100 lamps)

Wattages	300 Watts			500 Watts			1000 Watts			1500 Watts		
Unit	A	B	C	A	B	C	A	B	C	A	B	C
	90 mm	110 mm	110 mm	130 mm	130 mm	130 mm	150 mm	150 mm	150 mm	170 mm	170 mm	170 mm
Cost of glass shells	16·13	67·988	55·635	37·17	82·750	68·471	53·11	112·817	93·312	82·88	144·479	119·587
Cost of caps	12·73	14·843	13·610	12·73	14·843	13·610	12·73	14·843	13·610	72·86	14·843	13·610
Cost of other material	26·93	82·280	68·571	85·57	110·110	91·266	164·93	168·190	138·998	262·93	232·320	191·940
TOTAL MATERIAL COST	55·79	165·111	137·816	135·47	207·703	173·347	230·77	295·850	245·920	418·67	391·642	325·137
Primary Packing Material	4·16	1·729	1·500	7·58	1·729	1·500	8·90	3·457	3·000	10·26	3·457	3·000
Conversion Cost	31·98	81·880	52·649	55·70	137·060	87·747	91·47	138·840	193·042	294·92	176·220	193·042
Packing for despatch	19·02	15·520	19·938	22·40	24·370	19·938	30·51	42·870	64·800	38·70	71·910	81·000
TOTAL	110·95	264·240	211·903	221·15	370·862	282·532	361·65	481·017	506·762	762·55	643·229	602·179
Selling expense excluding freight outward	..	13·635	13·420	..	19·136	19·830	..	24·820	43·630	..	33·191	43·630
Royalty at 2%	..	6·760	..	..	10·620	..	..	18·680	..	..	31·320	..
TOTAL EX-FACTORY COST	110·95	284·635	225·323	221·15	400·618	302·362	361·65	524·517	550·392	762·55	707·740	645·809

NOTE.—(a) Primary packing for high wattage lamps does not include cost of cartons as generally these are not supplied in cartons.

(b) Royalty calculated on unit B's net selling prices.

Table II

Referred to in para 10.2.4.

Comparative actual ex-factory cost of fluoroscent tubes.

(Rs. per 100 tubes.)

Particulars	4′—40 watts Day Light		5′—80 watts Day Light	
Unit	A	B	A	B
Cost of tubes	45·93	109·46	56·82	124·20
Cost of caps	14·30	10·55	14·30	10·55
Cost of other materials	36·28	153·21	52·67	222·84
TOTAL	96·51	273·22	123·79	357·59
Primary packing material	22·24	6·71	43·93	6·71
Conversion cost	46·69	163·59	63·11	212·38
Final packing	27·32	27·02	14·17	32·20
Selling	..	24·28	..	31·42
Royalty	..	13·20*	..	21·00*
Service charges	6·38	..	8·31	..
TOTAL EX-FACTORY COST	199·24	508·02	253·31	661·30

*At 3% on the net realisation on D. G. S. & D. rate contract rates.

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TABLE III

Comparative statement of actual cost of high pressure mercury vapour lamps (non-fluorescent)

(Rs. per lamp)

Unit	Quartz Type burners											Glass type burners	
	80 Watts 80 m.m.			125 Watts 80 m.m.			250 Watts 90 m.m.		400 Watts		1000 Watts	250 Watts	400 Watts
	Soft Glass Shells	Soft Glass Shells	Hard Glass Shells	Soft Glass Shells	Soft Glass Shells	Hard Glass Shells	Soft Glass Shells	Hard Glass Shells	Soft Glass Shells 120 m.m.	Hard Glass Shells 130 m.m.	Hard Glass Shells 165 m.m.	Soft Glass Shells 90 m.m.	Soft Glass Shells 120 m.m.
	CLEAR	CLEAR	FROST-ED	CLEAR	CLEAR	FROST-ED	CLEAR	FROST-ED	CLEAR	FROST-ED	FROST-ED	CLEAR	CLEAR
	A	B	D	A	B	D	B	D	B	D	D	B	B
Cost of shells	0·13	0·28	3·20	0·14	0·28	3·13	0·36	4·65	0·58	7·70	15·03	0·36	0·58
Cost of caps	0·18	0·07	0·17	0·18	0·07	0·17	0·07	0·68	0·07	1·46	1·46	0·07	0·07
Cost of burners	4·75	23·46	15·03	4·87	24·55	15·74	32·88	19·45	40·77	22·83	52·87	17·71	18·95
ther material cost	1·72	0·62	2·13	1·76	0·62	2·14	0·92	3·27	0·92	3·13	4·53	0·92	0·92
TOTAL MATERIAL COST	6·78	24·43	20·53	6·95	25·52	21·18	34·23	28·05	42·34	35·12	73·89	19·06	20·52
Primary packing material	0·10	1·50	0·22	0·11	1·50	0·22	1·50	0·23	1·50	0·83	1·56	1·50	1·50
Conversion cost	3·51	7·48	4·78	3·51	7·81	5·00	9·60	6·06	13·34	8·48	12·89	9·60	13·34
Packing	0·19	0·30	0·40	0·19	0·30	0·40	0·30	0·40	0·37	0·80	1·44	0·30	0·37
Selling (excluding forwarding)	..	1·74	1·24	..	1·81	1·29	2·35	1·66	2·97	2·17	4·31	1·57	1·84
TOTAL EX-FACTORY COST	10·58	34·45	27·17	10·76	36·94	28·09	47·98	36·40	60·52	47·40	94·09	32·03	37·57

TABLE IV (a)

Comparative statement of actual ex-factory cost of miniature lamps—Torch (including pre-focus) and Radio dial lamps.

Unit	TORCH		RADIO DIAL	
	A	A	B	B
	2·4 V	3·6 V	..	..
Material cost	3·48	3·50	2·42	4·22
Primary packing material cost . .	1·35	1·58	0·94	0·94
Conversion cost	5·82	5·82	9·17	15·94
Packing	0·05	0·05	1·24	1·24
Selling	..	..	0·70	1·15
TOTAL EX-FACTORY COST .	10·70	10·95	14·47	23·49

TABLE IV(b)

Comparative statement of actual ex-factory cost of (auto lamps)

(Rs. per 100 lamps)

Wattage	Head light lamps			Tail lamps		
	E		B	E		B
	British Pre-focus type without Shield 28 mm 45/36	Bosch Type without Shield 35 mm 45/36	Average cost 38 mm Shells	Single Filament 25 mm 18	Double Filament 25 mm 18/6	Average cost 25 mm Shells
Materials						
Glass shells . . .	13·21	10·89	12·36	9·51	9·51	7·25
Caps	8·56	15·10	4·31	4·38	4·38	3·12
Other materials . .	9·91	9·13	16·15	5·70	7·43	10·77
TOTAL MATERIAL COST .	31·68	35·12	32·82	19·59	21·32	21·14
Primary packing material cost . . .	7·40	7·40	5·48	4·38	4·38	3·20
Conversion cost . .	35·92	21·55	24.36	10·78	13·47	12·32
Packing	2·00	2·00	3·27	2·00	2·00	3·27
Selling	4·12	2·47	3·40	1·24	1·54	2·06
TOTAL EX-FACTORY COST.	81·12	68·54	69·33	37·99	42·71	41·99

10.2.5. In the case of unit C it was seen that the company had written off during the costed period a very large amount on account of loss on packing cases and sleeves for glass shells and included the same in the costs of glass shells. As, according to the current trade practice, only 10 per cent of the packing charges and the central sales tax thereon together with return freight on the empties is to be borne by the purchasers of shells, we have estimated these amounts including a reasonable allowance for possible spoilage and have admitted such costs besides the actual wastages including breakage in transit. In the case of unit A, for some of the items only hand blown glass shells have been used and in those cases for the actual period the corresponding costs of hand blown shells have been taken into account.

10.2.6. In the case of GLS lamps, it will be seen that the costs of unit A are much lower than those of units B and C for several reasons. For unit A, its large scale production on modern equipment with corresponding efficiency and economy involves lower conversion charges. The most important component, namely, glass shell was manufactured by unit A while it had to be purchased by the other costed companies. Unit A benefits not only from the difference between the selling price of glass shell and its cost of production but also from the saving on packing charges and breakages in transit. Further, the shells used by unit A are mostly machine blown with a lower cost of production, while the shells sold to others are hand blown with corresponding higher cost of production. Due to the peculiar organisation of unit A, as it sells its entire output to its five constituent selling companies, it has not to incur any of the usual selling expenses. Apart from the above, further reasons for the divergence of their costs arise from the larger breakages in shells in the process of manufacture of lamps by units B and C. Similarly, in the case of fluorescent tubes, while unit A manufactures the tubes, unit B still purchases the same from abroad involving a high percentage of breakages in transit. Representatives of unit B stated that due to various reasons it is not always possible for it to claim and get reimbursement for the breakages from the insurers.

10.2.7. From the table showing the actual costs of high pressure mercury vapour lamps, again unit A's costs appear to be disproportionately lower than those of the other two units. In this case, however, the products of the three companies are not similar and hence not strictly comparable. For example, unit D uses hard glass shells while unit B uses soft glass shells. Unit D uses frosted glass shells but unit A uses clear glass shell for non-fluorescent types of lamp. Unit A does not manufacture lamps with higher wattages than 125. For 250 and 400 watts unit B manufactures two types of lamps one with quartz burners and the other with glass tube burners, while unit D makes them with only quartz burners and hard glass shells. Of the three manufacturers unit A produced about 32,000 lamps in six months while unit D and unit B produced over the year about 25,000 and 9,000 lamps respectively. Besides the small production the breakage of unit B was unusually high and its high costs cannot be considered representative. On the other hand unit A's costs cannot also be taken as representative for the reasons (a) that the production of high pressure mercury vapour lamps was undertaken by it only for six months during the costed period; and (b) that it had not yet developed proper standards of costs of either shells or conversion charges. It is understood that burners will also be indigenously manufactured in the near future. One of the main reasons of divergence of the costs of units A and D is the great disparity in costs of burners which both are now importing. With the elimination of costs for units A and B for reasons given above, we are left with the costs of unit D only. It does not produce high pressure lamps with either soft glass shells or with glass tube burners. We, therefore, consider that these lines of production should be allowed some more time for development, stabilisation and standardisation of product, and it is not possible to attempt fixing their prices from the limited range of unit D's output.

10.2.8. In the field of miniature lamps unit A does not produce any types other than torch lamps. From the common man's point of view, the most important item of miniature lamps is the lamps for torches. The actual production of these lamps was about 3.2 millions by unit A and 1.5 millions by unit B. In the case of unit A it was possible to work out the costs of these lamps separately for each voltage, while for unit B only an average cost could be worked out. It was seen, however, that for unit A the actual costs for these lamps were not significantly different for each type and hence it is feasible to determine a ceiling price for all such lamps on the basis of the average of the two units.

10.2.9. In the case of lamps for automobiles, unit B produced about 1.5 million pieces in a year while unit E produced only 0.36 million pieces in six months. The varieties of auto lamps that are produced are very large in number and vary in voltage, wattage, shape and design. For the costed units we have given the tables as an indicator of actual costs for certain popular types and categories used as headlight lamps, tail and side lamps including flashers, etc. These correspond to types and makes of other manufacturers generally in use. While cost of individual items could be assessed in the case of unit E, it has been possible with the data available with unit B only to get the average conversion costs. Being fast moving items the bulk of the sales of these categories of lamps will be in the replacement market. Any rigidity in the matter of preference by automobile manufacturers in the matter of choice of lamps will gradually disappear with the need to use more and more of indigenous components.

11. Estimates of future cost.

11.1. Estimated production for future.—Both units B and C have schemes of expansion to be undertaken in the immediate future for the production of electric lamps including manufacture of glass shells. Apart from uncertainties regarding exchange and import policies which affect the capital cost and the phased programme of implementation it would also be very difficult to make realistic estimates of the cost of production during such a period of flux. Such new plants which are being installed may have larger output and greater operational efficiency and there might be changes in the organisational set up. It is, therefore, suggested that the prices we now recommend may be revised after three years, that is, after the major expansion programmes actually come into effect. Meanwhile, we have assumed that at least during the next three years the production will not differ widely from the present level. We have, however, noted certain improvements in the efficiency factor, which will result in a slight increase in production. As for unit A it had, in fact, originally planned for a double shift working in one of its automatic lines but abandoned it after the recent announcement of restrictions in foreign exchange availability for imports. The estimated costs have, therefore, been worked out on the estimates of production on the present basis detailed in the table on page No. 30.

11.2. Estimates of future cost.

11.2.1. From the production figures for GLS Lamps of the three units and their actual cost of production as shown in Table No. I under paragraph 10.2.4. it will be clear that any weighted average of costs of these units will result in figures which will be very disadvantageous to either unit B or unit C, the medium-scale units as well as to the small units. In the short period when the level of output of even these units has to be maintained to avoid shortages, it would be desirable that prices should be fixed at such levels as would enable these companies also to establish themselves and develop further.

11.2.2. One of the most important factors for the above situation is the disparity in the element of costs of glass shells as between unit A and the other two units which have been referred to earlier.

11.2.3. The question arises whether the profit element in the prices for glass shells charged to other lamp manufacturers by unit A and its sister concern is excessive. We have also obtained from unit A's sister concern the average cost of production of the glass shells for their latest years and examined the position. While it must be said that for unit A the margin in current selling prices of these glass shells is very comfortable, it cannot be said to be so in respect of glass shells sold by its sister concern. The marketing price for the two producers of glass shells has naturally to be uniform. It has to be noted that since the glass shells are sold at f.o.r. destination prices, besides actual cost of the glass shells, we have also to take into account the average railway freight between the locations of the factories of the two units and various destinations. We have estimated the average railway freight taking note of the locations of the different units manufacturing GLS lamps who have to purchase their shells. Since the bulk of glass shells produced is of the 60 mm. size, the average costs will more or less represent the cost of this item. For example, in the case of unit A, where all the details were available, while the average cost of hand blown glass shells worked out to Rs. 85.91 per 1000, the actual cost of production of 60 mm. glass shells (clear) was Rs. 79.35 per 1000. Again for machine blown shells, while the actual average cost per 1000

Statement showing actual production during the costed period and estimated production per annum for the next three years.

(In Million Nos.)

Categories	A		B		C		D		E	
	Production during costed period	Estimated future production	Production during costed period	Estimated future production	Production during costed period	Estimated future production	Production during costed period	Estimated future production	Production during costed period	Estimated future production
1. G.L.S. lamps below 300 w. . . .	15·488	15·513	2·312	2·631	2·419	2·501	..	..	..	..
2. G.L.S. lamps above 300 w. . . .	0·300	0·470	0·053	0·056	0·031	0·032	..	..	..	..
3. Fluorescent tubes .	1·925	2·000	0·086	0·141	..	..	..	..	..	..
4. Auto lamps . .	..	..	1·154	1·212	..	..	..	..	0·360*	0·720
5. Miniature lamps .	3·184	3·200	1·539	1·616	..	..	..	..	..	..
6. Mercury vapour lamps	*0·032	0·100	0·009	0·099	..	..	0·025	0·030	..	..
7. Others . . .	..	..	1·054	1·107	..	..	..	..	..	..

*Production for six months.

shells worked out to Rs. 53.27, the cost of 60 mm. glass shells (clear) worked out to Rs. 53.04 per 1000. The average cost of glass shells per 1000 for the other unit worked out to Rs. 105.39 for the year 1960 and it has been estimated at Rs. 106.93 for the year 1963. Since the pattern of production of glass shells at its sister concern should not be much different from that at unit A, it would not be far wrong to assume that the actual cost for 60 mm. clear glass shells would be around Rs. 100. The average freight outward for the other unit has been estimated by us (taking into consideration number of shells put in one box and the average number of boxes that can be put in a wagon) at about Rs. 5 per 1000 shells of 60 mm. size. Thus, the cost excluding selling expenses but including average freight outward for 60 mm. shells for the other unit would be round about Rs. 105 per 1000 as against their selling price of Rs. 108 per 1000 indicating a reasonable margin. The units licensed for shell manufacture are not likely to be in production for two or three years and meanwhile the only producers of shells who may have some quantity to spare if they expand production by hand blowing are located at Calcutta and can cater to demand of nearby lamp units. Since to supply the glass shells to the industry, both the units mentioned above and units similarly placed have to be in production, it cannot be said that the prices charged to the third parties are excessive.

11.2.4. Incidentally, we have also examined the cost of bayonet type caps manufactured by Hind compared to the corresponding selling price and in this case also, we do not think that the prices charged are unreasonable.

11.2.5. It is not a practical proposition for lamp manufacturers with comparatively small capacities to blow their own shells. So far there is no independent unit producing only shells. In such circumstances, in our opinion, the build up of a reasonable estimated cost of GLS type lamps should include the cost of glass shells at the rates at which these are available to manufacturers with smaller capacities. As already mentioned above, it is understood that both unit B and unit C have schemes for producing their own glass shells. If the schemes fructify, no doubt, the cost of glass shells for these units will become lower. On the other hand, as has been represented by unit A, this will lead to curtailment of production of glass shells by it and its sister concern increasing their costs not only because of distribution of overheads over a lower output but also on account of such charges as lay-off compensation to be paid to workers. We have not considered it necessary to make any adjustment in the cost of unit A and its sister concern on account of the last contingency. In any case, for the next two or three years, the position will be rather fluid and there would be little chance that the costs to the other producers (who have no schemes for blowing their own shells) would become lower

11.2.6. In view of the position explained in the above paragraph, the margin for unit A in any uniform price to be recommended, would be very high compared to what could be considered as reasonable for others. But this cannot be avoided if the prices to be fixed should be found remunerative also to the medium size and smaller producers. The recommendation we have made earlier in paragraph 8.2.2. to cast an obligation for export on low cost producers will have to be considered in the context.

11.2.7. We have found it necessary to adjust cost estimates so as to avoid any abnormality in incidence. Breakages in process for unit A were less than 7 per cent while those for unit B worked out to about 38 per cent and for unit C to about 15 per cent including breakages in transit for lamps upto 100 watts and 10 per cent for lamps above 100 watts. Since unit A is mostly using machine blown shells with heavier stems, it is perhaps reasonable to assume that the wastage for the other manufacturers who have to use hand blown shells would be somewhat higher. The representative of unit B admitted that its breakages were excessive, the main reason being defective gas supply and stated that this is likely to be corrected shortly. We have, therefore, assumed that a reasonable breakage for the two units other than unit A may be taken at 12.5 per cent for electric lamps upto 100 watts and 10 per cent for electric lamps above 100 watts including the breakage in transit. The breakage in transit has been assumed at about 3 per cent and thus comparable figures for breakages in processes would be about 9.5 per cent upto 100 watts and 7 per cent for higher wattages as compared to unit A's less than 7 per cent.

11.2.8. For other factors of conversion charges, we have made suitable adjustments such as for normal annual increments in wages and salaries, probable increase in the rates of consumable stores, etc., on the merits.

11.2.9. In view of the emergency it is possible that during the next two or three years costs may be affected to an extent that cannot be completely foreseen on account of incidence of fiscal levies and even freight. The economies of production may also get slightly affected by the impact of licensing policy. To provide against such contingencies, a margin calculated at 4 per cent on fair estimated costs excluding depreciation and selling expenses has also been provided.

11.2.10. As already observed, the costs of unit A do not include any selling expenses, which are obviously met from the plentiful margin available to the companies who constitute its selling organisation. Therefore, for a proper build-up of the estimated ex-factory costs, we have added reasonable selling expenses on the basis of a simple average of such expenses incurred by the other two units. Even after the above adjustments, it is seen that the costs of unit A are much lower than those for the other two units. To allow a full weightage for unit A will adversely affect all other units. Therefore, we have adopted a simple average of the costs of the three units (after carrying out the above adjustments) as a representative estimate of costs of GLS lamps for the industry as a whole. It may be noted that even the simple average may press hard on the two units other than unit A. But having removed the special causes for such disparity which should have made unit A's costs justifiably lower than those of other units, and having also taken the simple average which automatically gives higher weight to the smaller units, we do not think that any other concession should be made for favouring the units with smaller output and lower efficiency. There is no reason why the conversion costs of these other units should be sustained at a level almost double that of unit A, even granting that unit A is a large-scale producer. In the interest of the proper development of the industry as well as that of the consumer no other course can be followed. The smaller units will however have to make a determined effort to bring down their costs.

11.2.11. In the case of fluorescent tubes, of the two units, unit B produced only about 86,000 pieces as against unit A's 2 million pieces. In the actual period, it was noticed that the breakages of tubes stood at a very high figure of about 90 per cent for unit B. From the statements of actual costs given in paragraph 10.2.4., unit B's costs would appear to be high and unrepresentative. At the same time if the future prices are based on the estimated costs of unit A only they might be too low and hurt other producers. We have, therefore, estimated the costs of unit B after making adjustments for reasonable wastage and have taken a simple average cost of both units for purposes of determining the prices of fluorescent tubes. In estimating the costs of fluorescent tubes, we have taken note of the fact that the brass caps for fluorescent tubes are to be produced by unit A in future.

11.2.12. For reasons explained in paragraph 10.2.7. representative estimates of high pressure mercury vapour lamps have not been worked out for the future. We have, however, estimated the future costs of unit D which will be purely an ad hoc indicator. Similarly we have estimated the costs of selected types of head and tail side lamps for unit E which could be taken within limits as indicators of fair prices for comparable categories.

11.2.13. The estimates of ex-factory costs are shown in the following tables for typical varieties under each category:—

TABLE I(a)

Estimated Costs for future—Incandescent lamps

(Rs. per 100 lamps)

	25 Watts (60 m.m.) clear				40 Watts (60 m.m.) clear				60 Watts (60 m.m.) clear			
	A	B	C	Average	A	B	C	Average	A	B	C	Average
1. (a) Cost of Glass Shells	12·59	14·11	14·21	13·63	12·59	14·11	14·21	13·63	12·59	14·11	14·21	13·63
(b) Cost of Caps . .	7·31	7·28	7·55	7·38	7·41	7·28	7·55	7·41	7·41	7·28	7·55	7·41
(c) Cost of other Material	6·24	5·31	4·94	5·50	7·06	6·25	5·94	6·42	7·39	7·45	7·34	7·39
TOTAL MATERIAL COST .	26·14	26·70	26·70	26·51	27·06	27·64	27·70	27·45	27·39	28·84	29·10	28·43
2. (a) Primary Packing Material	5·67	5·85	3·10	4·87	5·67	5·85	3·10	4·88	5·67	5·85	3·10	4·88
(b) Conversion cost .	9·92	17·78	17·79	15·16	9·92	17·78	17·79	15·16	9·92	17·78	17·79	15·16
(c) Packing . . .	3·91	4·27	2·02	3·40	3·91	4·27	2·02	3·40	3·91	4·27	2·02	3·40
3. TOTAL . . .	45·64	54·60	49·61	49·94	46·56	55·54	50·61	50·90	46·89	56·74	52·01	51·87
4. Selling . . .	3·42	2·73	4·42	3·52	3·45	2·78	4·42	3·55	3·48	2·84	4·42	3·58
5. TOTAL EX-FACTORY COST	49·06	57·33	54·03	53·46	50·01	58·32	55·03	54·45	50·37	59·58	56·43	55·45
6. Returns . . .	2·92	3·35	4·34	3·54	2·96	3·40	4·34	3·57	2·97	3·46	4·46	3·63
7.	51·98	60·68	58·37	57·00	52·97	61·72	59·37	58·02	53·34	63·04	60·89	59·08

8. Freight outwards for an average lead of 1200 Km.	1·18	1·18	1·18	1·18	1·18	1·18	1·18	1·18	1·18	1·18	1·18	1·18
9.	53·16	61·86	59·55	58·18	54·15	62·90	60·55	59·20	54·52	64·22	62·07	60·26
10. Provision for breakage at 1·5%	0·80	0·93	0·89	0·87	0·81	0·94	0·91	0·89	0·82	0·96	0·93	0·90
11.	53·96	62·79	60·44	59·05	54·96	63·84	61·46	60·09	55·34	65·18	63·00	61·16
12. Royalty	..	1·15	..	0·38	..	1·17	..	0·39	..	1·19	..	0·40
13.	53·96	63·94	60·44	59·43	54·94	65·01	61·46	60·48	55·34	66·37	63·00	61·56
14. Provision for contingencies	..	..	..	2·14	..	..	..	2·18	..	..	..	2·22
15. Fair Factory price	..	..	..	61·57	..	..	..	62·66	..	..	..	63·78
16. Margin for distribution	..	..	..	36·94	..	..	..	37·60	..	..	..	38·27
17. Retail Price	..	..	..	98·51	..	..	..	100·26	..	..	..	102·05

TABLE I(a)—*contd.*

Estimated Costs for future—Incandescent lamps

(Rs. per 100 lamps)

	100 Watts (70 mm.) clear				G. F. Train Lamp (50 mm.)			
	A	B	C	Average	A	B	C	Average
1. (a) Cost of Glass Shells	15·16	17·12	17·26	16·51	11·66	12·93	12·98	12·52
(b) Cost of Caps	7·41	7·28	7·55	7·41	6·73	7·28	6·10	6·70
(c) Cost of Other Material	8·61	9·78	10·33	9·57	7·23	5·98	6·22	6·48
TOTAL MATERIAL COST	31·18	34·18	35·14	33·49	25·62	26·19	25·30	25·70
2. (a) Primary Packing Material	5·67	8·05	5·00	6·24	3·20	4·90	3·10	3·73
(b) Conversion Cost	9·92	17·78	17·79	15·16	18·68	17·78	17·79	18·09
(c) Packing	3·91	8·44	4·39	5·58	1·78	3·12	2·02	2·31
3. TOTAL	50·68	68·45	62·32	60·47	49·28	51·99	48·21	49·83
4. Selling	3·77	3·42	4·42	3·87	3·69	2·60	4·42	3·57
5. TOTAL EX-FACTORY COST	54·45	71·87	66·74	64·34	52·97	54·59	52·63	53·40
6. Return	3·04	4·07	4·98	4·04	4·82	3·21	4·27	4·09
7. TOTAL	57·49	75·94	71·72	68·38	57·79	57·80	56·90	57·49
8. Freight outwards for an average lead of 1200 Km.	1·18	1·18	1·18	1·18	0·99	0·99	0·99	0·99
9. TOTAL	58·67	77·12	72·90	69·56	58·78	58·79	57·89	58·48

10. Provision for breakage at 1·5%	0·88	1·16	1·09	1·04	0·88	0·88	0·87	0·88
11. TOTAL	59·55	78·28	73·99	70·60	59·66	59·67	58·76	59·36
12. Royalty	..	1·38	..	0·46	..	1·10	..	0·39
13. TOTAL	59·55	79·66	73·99	71·06	59·66	60·83	58·76	59·75
14. Provision for contingencies	..	..	..	2·60	..	..	..	2·09
15. Fair Factory Price	..	..	..	73·66	..	..	..	61·84
16. Margin for distribution	..	..	..	44·20	..	..	..	..
17. Retail Price	..	..	..	117·86	..	..	..	..

TABLE I(b)

Estimated Costs for future—High Wattage Lamps

(Rs. per 100 lamps.)

	300 Watts (110 mm.) Clear				500 Watts (130 mm.) Clear				1000 Watts (150 mm.) Clear			
	A	B	C	Average	A	B	C	Average	A	B	C	Average
1. (a) Cost of Glass Shells	50·14	54·99	55·38	53·50	58·30	66·93	68·16	64·46	79·87	91·25	92·89	88·00
(b) Cost of Caps . .	19·40	12·33	13·61	15·11	12·75	12·33	13·61	12·90	12·75	12·33	13·61	12·90
(c) Cost of Other Material	26·50	68·35	66·72	53·86	93·99	91·46	90·17	91·87	191·92	139·71	137·75	156·46
TOTAL MATERIAL COST .	96·04	135·67	135·71	122·47	165·04	170·72	171·94	169·23	284·54	243·29	244·25	257·36
2. (a) Primary Packing Material . . .	4·42	1·73	1·50	2·55	8·01	1·73	1·50	3·75	9·40	3·46	3·00	5·29
(b) Conversion Cost .	23·59	68·01	53·38	48·33	76·10	113·85	88·97	92·97	77·53	115·33	195·69	129·52
(c) Packing . . .	19·59	36·94	19·97	25·50	23·07	46·75	19·97	29·93	31·43	70·13	64·83	55·46
3. TOTAL	143·64	242·35	210·56	198·85	272·22	333·05	282·38	295·88	402·90	432·21	507·77	447·63
4. Selling . . .	12·77	12·12	12·07	12·32	18·24	16·65	20·14	18·35	32·62	21·61	44·29	32·84
5. TOTAL EX-FACTORY COST	156·41	254·47	222·63	211·17	290·46	349·70	302·52	314·23	435·52	453·82	552·06	480·47
6. Return . . .	6·95	13·63	16·10	12·23	17·86	19·00	23·42	20·09	22·87	24·22	45·84	30·97
7. TOTAL . . .	163·36	268·10	238·73	223·40	308·32	368·70	325·94	334·32	458·39	478·04	597·90	511·44

8. Freight outwards for an averagel ead of 1200 KM	3·82	3·82	3·82	3·82	15·02	15·02	15·02	15·02	18·77	18·77	18·77	18·77
9. TOTAL . . .	167·18	271·92	242·55	227·22	323·34	383·72	340·96	349·34	477·16	496·81	616·67	530·21
10. Provision for breakages at 1·5% . . .	2·51	4·08	3·64	3·41	4·85	5·76	5·11	5·24	7·16	7·46	9·25	7·96
11. TOTAL . . .	169·69	276·00	246·19	230·63	328·19	389·48	346·07	354·58	484·32	504·27	625·92	538·17
12. Royalty . . .	..	4·50	..	1·50	..	6·72	..	2·24	..	10·29	..	3·43
13. TOTAL	169·69	280·50	246·19	232·13	328·19	396·20	346·07	356·82	484·32	514·56	625·92	541·60
14. Provision for Contingencies . . .	..	..	..	8·57	..	..	..	12·51	..	..	..	19·58
15. Factory Price . .	..	..	..	240·70	..	..	..	369·33	..	..	..	561·18
16. Margin for distribution	..	..	..	144·42	..	..	..	221·60	..	..	..	336·71
17. Retail Price . .	..	..	..	385·12	..	..	..	590·93	..	..	..	897·89

TABLE II

Estimated Cost for future—Fluorescent Tubes

(Rs. per 100 Tubes)

	2′—20 Watts Day light			4′—40 Watts Day light			5′—80 Watts Day light		
	A	B	Average	A	B	Average	A	B	Average
1. (a) Cost of Tubes	24·42	48·00	36·21	44·70	61·92	53·31	56·55	70·92	63·74
(b) Cost of Caps	26·13	9·29	17·71	26·13	9·29	17·71	26·13	9·29	17·71
(c) Cost of Other Materials	22·84	62·95	42·90	33·07	94·42	63·75	48·71	137·34	93·02
TOTAL	73·39	120·24	96·82	103·90	165·63	134·77	131·39	217·55	174·47
2. (a) Primary Packing material	22·44	6·71	14·58	23·48	6·71	15·09	46·25	6·71	26·48
(b) Conversion Cost	47·89	99·05	73·47	48·06	100·82	74·44	66·68	130·89	98·78
(c) Final Packing	3·59	13·51	8·55	28·14	27·02	27·58	14·60	32·20	23·40
3. TOTAL	147·31	239·51	193·42	203·58	300·18	251·88	258·92	387·35	323·13
4. Selling	10·89	11·98	11·43	15·00	15·01	15·00	19·09	19·38	19·24
5. TOTAL	158·20	251·49	204·85	218·58	315·19	266·88	278·01	406·73	342·37
6. Return	13·99	15·96	14·98	17·78	19·21	18·50	21·65	24·81	23·23
7. TOTAL	172·19	267·45	219·83	236·36	334·40	285·38	299·66	431·54	365·60
8. Freight outwards for an average lead of 1200 KM.	5·12	5·12	5·12	10·01	10·01	10·01	13·22	13·22	13·22
9. TOTAL	177·31	272·57	224·95	246·37	344·41	295·39	312·88	444·76	378·82

10. Provision for breakages at 1·5%	2·65	4·09	3·37	3·69	5·17	4·43	4·69	6·67	5·68
11. TOTAL	179·96	276·66	228·32	250·06	349·58	299·82	317·57	451·43	384·50
12. Royalty/Service Charges	5·42	6·78	6·10	6·79	8·79	7·80	8·84	11·27	10·06
13. Provision for contingencies	..	..	8·34	..	..	11·00	..	..	14·16
14. Factory price	..	..	242·76	..	..	318·62	..	..	408·72
15. Margin for distribution	..	..	145·66	..	..	191·17	..	..	245·23
16. Selling price	..	..	388·42	..	..	509·79	..	..	653·95

TABLE III

Statement showing the estimated fair F. O. R. Price of High Pressure Mercury Vapour Lamps with hard glass shells and quartz burners

(Cost for each lamp)

	Unit D											
	80 Watts (80 mm.)		125Watts (80 mm.)		250 Watts (90 mm.)		400 Watts (130 mm.)		700 Watts (150 mm.)		1000 Watts (165 mm.)	
	Fluorescent	Non-fluorescent	Fluorescent	Non-fluorescent	Fluorescent	Non-fluoresent	Fluorescent	Non-fluorescent	Fluorescent	Non-fluorescent	Fluorescent	Non-fluorescent
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1. (a) Cost of Glass shells .	3·19	3·19	3·13	3·13	4·65	4·65	7·70	7·70	11·96	11·96	15·03	15·03
(b) Cost of Caps .	0·18	0·18	0·18	0·18	0·68	0·68	1·46	1·46	1·46	1·46	1·46	1·46
(c) Cost of Burners .	15·03	15·03	15·75	15·75	20·57	20·57	25·16	24·16	42·76	42·76	55·75	55·75
(d) Cost of Other Materials	3·19	2·14	3·40	2·14	4·84	3·27	5·13	3·24	8·41	5·21	8·74	4·53
TOTAL	21·59	20·54	22·46	21·20	30·74	29·17	38·45	36·56	64·59	61·39	80·98	76·77
2. (a) Primary Packing Materials.	0·22	0·22	0·22	0·22	0·24	0·24	0·85	0·85	1·27	1·27	1·59	1·59
(b) Conversion Cost .	4·05	3·95	4·29	4·18	5·24	5·11	7·66	7·53	11·19	10·96	11·51	11·23
(c) Packing . . .	0·41	0·41	0·41	0·41	0·41	0·41	0·82	0·81	1·47	1·47	1·47	1·47
3. TOTAL	26·27	25·12	27·38	26·01	36·63	34·93	47·78	45·75	78·52	75·09	95·55	91·06

4. Selling . . .	1·06	1·01	1·10	1·05	1·46	1·40	1·93	1·85	3·19	3·06	3·85	3·68
5. TOTAL EX-FACTORY COST	27·33	26·13	28·48	27·06	38·09	36·33	49·71	47·60	81·71	78·15	99·40	94·74
6. Return . . .	1·62	1·56	1·67	1·61	2·20	2·11	2·80	2·70	4·61	4·43	5·51	5·27
7. TOTAL . . .	28·95	27·69	30·15	28·67	40·29	38·44	52·51	50·30	86·32	82·58	104·91	100·01
8. Freight outwards for an average lead of 1200 KM. . . .	0·14	0·14	0·14	0·14	0·16	0·16	0·30	0·30	0·54	0·54	0·54	0·54
9. TOTAL . . .	29·09	27·83	30·29	28·81	40·45	38·60	52·81	50·60	86·86	83·12	105·45	100·55
10. Provision for breakages in transit (Insurance Premium). . .	0·20	0·19	0·21	0·19	0·27	0·26	0·36	0·34	0·58	0·56	0·71	0·68
11. F.O.R. Price . .	29·29	28·02	30·50	29·00	40·72	38·86	53·17	50·94	87·44	83·68	106·16	101·23
12. Provision for Contingencies . . .	1·13	1·08	1·17	1·12	1·57	1·50	2·05	1·96	3·37	3·23	4·10	3·91
13. Factory Price . .	30·42	29·10	31·67	30·12	42·29	40·36	55·22	52·90	90·81	86·91	110·26	105·14

TABLE IV(a)

Estimated Costs for future—Torch (all types including pre-focus) and Radio Dial Lamps

(Rs. per 100 lamps)

	Torch Lamps			Radio Dial Lamp
	A	B	Average	B
1. Material Cost	3·58	2·31	2·95	4·01
2. (a) Primary Packing Material .	1·58	0·94	1·26	0·94
(b) Conversion Cost . . .	6·25	8·73	7·49	15·15
(c) Packing	0·05	1·24	0·64	1·24
3. TOTAL	11·46	13·22	12·34	21·34
4. Selling	0·66	0·66	0·66	1·67
5. TOTAL	12·12	13·88	13·00	23·01
6. Return	2·16	0·97	1·57	1·62
7. TOTAL	14·28	14·85	14·57	24·63
8. Freight outwards for an average lead of 1200 KM . . .	0·11	0·11	0·11	0·11
9. TOTAL	14·39	14·96	14·68	24·74
10. Provision for breakages at 1·5%	..	..	0·22	0·37
11. Royalty/Service Charges . .	0·45	..	0·22	..
12. F. O. R. Price	..	..	15·12	25·11
13. Provision for Contingencies .	..	..	0·50	0·90
14. Factory Price	..	..	15·62	26·01
15. Margin for Distribution . .	..	..	9·38	15·61
16. Selling Price	..	..	25·00	41·62

TABLE IV(b)

Statement showing the Estimated Cost of Auto Lamps

(Rs. per 100 lamps)

	UNIT E					
	Head Lights (without Shield)				Tail Lamps and Side Lamps	
	Bosch Type		British Prefocus Type		With Double Filament	With Single Filament
Volts	6/12	24	6/12	24	6/12 & 24	6/12 & 24
Watts	36/36	36/36	36/36	36/36	18/6	18
Shell Size . .	35 m.m.	35 mm.	28 mm.	28 mm.	25 mm.	25 mm.
1. (a) Cost of Shells . .	10·89	10·89	13·21	13·21	9·51	9·51
(b) Cost of Caps . .	15·10	15·10	8·56	8·56	4·38	4·38
(c) Other Material Cost	8·99	14·09	9·75	15·38	7·43	5·70
TOTAL MATERIAL COST .	34·98	40·08	31·52	37·51	21·32	19·59
2. (a) Primary Packing Material Cost . .	7·40	7·40	7·40	7·40	4·38	4·38
(b) Conversion Cost .	21·55	21·55	35·92	35·92	13·47	10·78
(c) Final Packing Cost .	2·00	2·00	2·00	2·00	2·00	2·00
3. Selling	2·47	2·47	4·12	4·12	1·54	1·24
4. TOTAL EX-FACTORY COST	68·40	73·50	80·96	86·59	42·71	37·99
5. Return	7·44	7·70	10·77	11·05	5·38	3·92
6. TOTAL	75·84	81·20	91·73	97·64	48·09	41·91
7. Freight outwards for an average lead of 1200 KM	1·42	1·42	1·42	1·42	1·42	1·42
8. TOTAL	77·26	82·62	93·15	99·06	49·51	43·33
9. Provision for breakage at 1·5%	1·16	1·24	1·40	1·49	0·74	0·65
10. TOTAL	78·42	83·86	94·55	100·55	50·25	43·98
11. Provision for Contingencies	2·80	3·01	3·22	3·45	1·77	1·58
12. Factory Price . .	81·22	86·87	97·77	104·00	52·02	45·56
13. Margin for Distribution.	48·73	52·12	58·66	62·40	31·21	27·34
14. Retail Price . . .	129·95	138·99	156·43	166·40	83·23	72·90

11.2.14. It has been reported that since the price differentials in the market are more favourable to lamps with higher wattages compared to the actual cost differentials between the respective categories of lamps, there is a tendency on the part of manufacturers to reduce production of low wattage lamps. In order to discourage such a practice and to promote the production of lamps more in accordance with actual demand it is necessary that the price differentials to be recommended should be in accordance with the actual cost differentials. However, for GLS lamps of 75 watts and 100 watts while Mysore Lamps and Pradip Lamps use 70 mm. shells ELMI uses 60 mm. shells. This results in a higher cost of shells for these two varieties for the first two companies, a position which may apply to other medium-size producers also. We have inquired of the various manufacturers whether they could switch over to 60 mm. shells for electric lamps of 75 and 100 watts. Most of them have replied that with their present methods of production they are not in a position to switch over to 60 mm. shells for these types of lamps immediately. The standards laid down by the Indian Standards Institution have also indicated the maximum diameter of the bulbs for these categories of electric lamps at 71 mm. In these circumstances for build-up of 75 and 100 watts lamps' estimates we have used the cost of glass shells of 70 mm. diameter. This may mean an extra price advantage to those who use the smaller shell. Similarly, in the case of 300 watt lamps ELMI uses 90 mm. shells while others use 110 mm. which we have adopted for our calculation. Since the prices to be recommended are only for a limited period of three years, those can be revised at the time of the next inquiry when the other companies should have changed over the lower size shells.

11.3. Capital employed and working capital.

11.3.1. In the case of unit A the net fixed assets could be worked out for the several departments. Since for unit A we have replaced the actual cost of glass shells with a notional cost as applicable to the other manufacturers, we have excluded from the net fixed assets, all those assets linked up with the production of glass shells. In the case of other units also the net fixed assets for the separate departments have been worked out on the basis of available data.

11.3.2. The overall average working capital worked out to 2.2 months' cost of production for unit A, 14.3 months' cost of production for unit C and 5.4 months' cost of production for unit B. Unit C carried very large stocks of raw materials and the figure of working capital computed for it cannot be taken as representative. Similarly, in the case of unit A because of the peculiar link-up with its principals (under whose brand names the lamps are ultimately sold) it has not to keep any stock of the finished lamps. Moreover, it has not to carry a stock of the finished shells in the same way as other manufacturers who have to purchase them. Hence the working capital ascertained for it will also not be representative of the usual conditions of the industry including the selling activities. Unit B's figure of working capital is in between the two extremes and may perhaps be taken as representative of the units other than unit A. In the case of unit A since the glass shells have been taken at the notional costs which includes a good margin over the actual costs it will not be necessary to provide return on that portion of the working capital as would represent stock of glass shells and raw materials for making glass shells. We have, therefore, worked out the balance working capital excluding glass shells and any other raw materials required for producing glass shells and related the same to the balance of the cost of production (*i.e.*, excluding the cost of glass shells). This works out to 1.9 months' or 2 months' cost of production (excluding glass shells). In order to provide for a return which will not only remunerate unit A for its present activities but also for the selling activities, had it been undertaken by unit A instead of its sales organisations, we have provided for another 2 months' cost of production for carrying stock of finished goods. Thus for unit A, we have calculated the working capital at 4 months' cost of production excluding depreciation and cost of glass shells for GLS lamps and at 4 months' cost of production less depreciation only for all other kinds of lamps. For the other units an equivalent of 5 months' cost has been adopted.

11.3.3. We consider that a return at 12 per cent of the capital employed calculated as the sum of the net fixed assets and working capital would be adequate to provide for the usual commitments of the electric lamp industry including interest on borrowings, labour bonus, etc., and a fair return to the share-holders. In order to arrive at a fair ex-works price, we have distributed the total return calculated for each department to the total products in that department suitably. On this basis the fair ex-works prices have been worked out.

11.3.4. For unit A, with inclusion of notional cost of glass shells and selling expenses, the actual return will work out to a much higher figure than what is normally considered to be reasonable. But the whole of this cannot be retained by unit A as it has to sell its products to its principals at contractual rates.

11.3.5. The present system of sales is on the basis of f.o.r. destination price. To the above prices, therefore, the average railway freight has to be added. Taking into account the heavy concentration of electric lamp manufacture at Calcutta we are of the opinion that a lead of about 1200 kilometres will be a fair average of the distances to be covered in carrying the electric lamps to all destinations throughout India. On the basis of the standard weights of cases of the different articles we have estimated the average railway freight taking into account the number of lamps packed in a case and have added it to the fair ex-works price to arrive at a fair price for the producers for articles delivered free at the destination.

11.3.6. According to the usual trade practice the manufacturers have to make good any breakages in the electric lamps despatched to their customers. We understand that this is accomplished in various ways, *viz.*, by actually replacing the breakages or by paying compensation therefor or by allowing a special discount in addition to the normal one. In one of the cases it was seen that the outward despatches are insured and the manufacturers could induce the insuring companies to reduce the premium to 1.5 per cent of the value of the despatched goods. We consider that this would be a reasonable measure for the possible breakages in transit and have accordingly provided 1.5 per cent on the ex-works prices as allowances for breakages.

11.3.7. Ordinary GLS electric lamps may be manufactured with the filaments either in the form of single coils or coiled coils. Coiled coils cost somewhat more than the single coils. But the difference is not significant. It is seen from Indian Standard Specifications of GLS lamps that, with the same consumption of energy, lamps with coiled coils emit 11.7 to 24.6 per cent more lumens than lamps with single coils operated at 230/250 volts. To the ordinary consumer, therefore, electric lamps with coiled coils would represent an advantage from the point of view of service received *i.e.*, light emitted. We have provided for an *ad hoc* addition of 3P. in the retail prices for coiled coil GLS lamps up to 100 watts. The same margin has been allowed for GLS lamps with reinforced coil.

12. Selling system.

12.1. A striking feature of the lamp industry on its sales side is that it is not a specialised trade. No trader in electric goods deals exclusively in lamps and no retailer sells only electric lamps. They are invariably sold with other electrical equipment or stores. It is not uncommon to find electric lamps as an item of sale even in multi-purpose shops, such as oil-man stores and grocer's shops. An important consequence of this is that producers cannot have a direct control over such ultimate retailers and therefore only some impersonal or indirect method of control is to be adopted over the resale prices.

12.2.1. While such is the nature of the selling system it is suggested that even large producers in the country may be following unfair practices. The ELMI-Hind group together with Phillips and their selling organisations have a predominant share in the output of electric lamps in the country and their distribution. The apprehension expressed by many is therefore that they may be exploiting the situation by charging high prices. But it is important to realise that these producers do not have a monopoly of supply as they contribute only 60 per cent of the aggregate output. But being the more efficient of the two segments, their cost of production is relatively lower and the prices that they fix could become more competitive. As they have acquired and are exercising at present a degree of price leadership, their selling organisations virtually determine the pattern of prices which is followed by others.

12.2.2. As already observed the selling agents of ELMI were importers of electric lamps from their parent organisations abroad. With the changed circumstances in the country they decided to produce lamps indigenously to replace imports. Such production is, however, concentrated in one unit as it would have been uneconomical to set up separate factories for each of the importing firms. To take advantage of the economies of scale they have set up one large concern confining financial collaboration among themselves. At the same time they have not surrendered the goodwill they have built up on their trade name by selling the local products with a new name. So, identical products from ELMI-Hind factories are differentiated by giving them the original trade names. It is debatable how far this is fair to the consumer, but in an age of product differentiation and imperfect competition there does not seem to be anything unusual in the practice.

12.3. The producers in the ILFA group have so far followed the price leadership of the ELMI-Hind group. They quote a uniform price for the products of all their constituents. Obviously this is for avoiding competition among themselves. To meet the higher premia commanded by the products bearing the original trade names of imported lamps, they offer higher discounts to the trade than what is allowed by the ELMI-Hind group. But the prices quoted by the ILFA group are not always lower than those of the ELMI-Hind group. They are higher in respect of vacuum lamps upto 25 watts, identical in the 40-100 watts range for gas filled lamps, and lower for high wattage lamps except for 750 watts. So far as fluorescent tubes are concerned, the ILFA prices are lower but in this case their production is only 3 per cent. By and large, the ILFA policy in respect of prices seems to be to play for safety by quoting prices as far as possible either lower or at par.

12.4.1. However enlightened the policy of the producers may be, scarcity conditions are bound to encourage dealers to exploit the situation by charging high prices particularly when there can be no effective control on resale prices. In the case of ELMI-Hind group the question of producers exercising control over the trade does not arise. The controllers are virtually the controlled, as it is the trade organisations in this country who have by mutual collaboration set up the producing establishment. Other producers outside the ELMI-Hind group too have no direct control over sales as the retailers are widely distributed. Therefore only impersonal control would be possible through stamping of prices on lamps and cartons. We, therefore, recommend that this practice of stamping prices on lamp cartons already adopted by some producers should be generally followed and retail prices should, to the extent possible, also be stamped on lamps in order that there could be better control over resale prices.

12.4.2. With one voice producers have generally contended that as they are manufacturers first and foremost, they do not exercise any control over the ultimate retail price or the margin retained by intermediate distributors. Some have stated that there are no standard agreements with dealers and selling agents and wholesalers as ELMI-Hind group are free to fix prices and trade margins. In some agreements with dealers that we have noticed they are exhorted only to avoid under-selling. In the case of ELMI-Hind group, particularly, as the selling organisations are also the shareholders, this disclaiming of responsibility is not satisfactory. We, therefore, impressed on producers their economic and social responsibility to see that apart from their own profit margin being reasonable, the prices charged to the trade by them or their selling agents and to the ultimate consumer are also in keeping with production costs and reasonable distribution expenses. Publication of price lists as per Government's behest is of no use unless producers and the trade co-operate to ensure that the consumer is able to buy at notified prices. In the woollen and cotton textile industry some large producers are in fact able to maintain control over marketing of their products through inter-dealer agreements and vigilance in dealing with complaints of profiteering. The producers' representatives, when we drew their attention to this, agreed to consider arrangements by which they could through their agreements with selling agents and other distributors ensure some control over margins so that the retail prices are effectively implemented in the interest of consumers. We recommend that producers should implement these suggestions satisfactorily.

12.4.3. It has been brought to our notice that not only high prices are being charged but that there are also certain unfair practices among dealers and at the retail end. It is said that fluorescent tubes which are now in short supply are offered for sale only if the fittings and accessories necessary for them (which are slow moving items) are also taken along with tubes. The defence of the trade against this complaint is that as they are asked by the selling agents and manufacturers to take certain unsaleable products and slow moving items along with electric lamps they in turn have to distribute their loss on sales over electric lamps so that what they lose on the swings they could make up on the roundabouts. But the retailers cannot arrogate to themselves any such right to distribute unevenly their burdens and losses on consumers of different commodities. This practice and the scope for abuse could be avoided by the stamping of prices on electric lamps as well as their cartons and by greater adherence by manufacturers to the suggestions we have made in the previous paragraph.

13. Future policy.

13.1. There is no gainsaying the fact that the demand for electric lamps is not only high at present but it is also likely to rise rapidly in the future in view of the accelerated power generation schemes, the rapid first pre-occupation of the industry should be to ease the scarcity situa- strides made in industrialisation and the increase of national income and its wider distribution leading to improved living conditions. The tion by augmenting production. The supply of lamps should be increased immediately and rise progressively in the future. As an immediate measure the existing leeway in production ought to be made up by all units assuming that the single shift operation policy is to continue. This will not involve much foreign exchange as it will be confined to the importation of some more of the components required from abroad. As a long range measure we recommend that the authorities should make a careful assessment of the excess capacity available in the industry. The bottlenecks in the utilisation of such capacity by modernised units should be ascertained and increased production ought to be permitted. The ELMI-Hind group, for instance, (and any other units which satisfy the condition we have suggested in paragraph 9.2.3.) should have permission immediately to operate second shift on a partial basis. One of the automatic lines for the GLS lamps could be given the facilities in the shape of imported materials to operate over a second shift. As a future policy the availability of foreign exchange for this ought to be the only limit for increased production with the utilisation of existing capacity.

13.2. This policy need not necessarily have an adverse impact on the ILFA group of producers. Their market need not necessarily shrink with the increased supply from the ELMI-Hind group. At present the envisaged demand exceeds supply and any marginal increase of supply would not deprive the ILFA group of their share of the existing market. No doubt some price reduction may become necessary by the ILFA group to retain their share of the market. This is envisaged because economies of increased output by the ELMI-Hind group ought to be made available to the consumer by the lowering of prices. Otherwise there is no justification in permitting the ELMI-Hind group to operate over a second shift.

13.3.1. If ELMI-Hind group is enabled to operate a second shift for GLS lamps the problem of component supply for the rest of the industry will come up for solution. At present the components made by these units are more than what they need for their own use and therefore the excess is being supplied to units in the ILFA group. ELMI-Hind representatives told us that their factory sales departments were supplying components to outsiders on the same basis as for their own production units. With a second shift operation they may not have much of a spill-over for transfer. The only feasible solution would be to expedite the setting up of separate units as already licensed for the manufacture of certain components for the industry. It was also suggested at the public inquiry that such an arrangement may be desirable even in the present context as there would always be a conflict of interests when the lamp makers undertake the manufacture of components with a view to meet the demand of others in the industry. With the best of intentions it may be difficult for them either to regulate the supply of it or to offer at prices which would be accepted as reasonable by the purchasers. Consequently it would be unwise to encourage them to instal further plants for the manufacture of components. Instead, it would be feasible to encourage an independent concern which would come forward to set up a separate plant for the manufacture of shells, glass rods and tubes, caps and any other components that could be made by it. The existing lamp makers can still transfer to others any spill-over in their output of components after their own absorption. Particularly in a pattern of industry where small units for GLS lamps continue to exist, a centralised unit for the manufacture of components appears to be very essential.

13.3.2. So far as brass caps are concerned as pointed out in paragraph 7.2.2. a few independent units are already coming up, who may be encouraged by the offer of adequate raw materials for going into full production, and necessary foreign exchange to import capital goods to commence production. These units could explore the possibilities of substituting aluminium for brass in the manufacture of caps. This would mean lesser drain on foreign exchange to start with and in due course the country is expected to be self-sufficient in aluminium. Of course, this has to be done in consultation with the cap manufacturers who may have to make some adjustments in their plants and also with the aluminium industry in the country which will be required to develop a suitable alloy and supply strips of the required quality. The Department of Technical Development should examine the problem further and concert measures for co-ordinating the needs of cap manufacturers with the aluminium industry. In the manufacture of glass shells and glass tubes for fluorescent lamps it would have been helpful if the glass factories in the country were interested in setting up the necessary plants for the purpose. But we are informed that they do not seem to be interested in this line of development as it involves segregated production of a special type of glass. However the possibility of encouraging the setting up of special units, for making these items should be explored further and any facilities needed by them may be offered.

13.4.1. One of the disturbing features on the demand side has been the variations periodically in favour of high or low wattage GLS lamps. This automatically creates periods of scarcity of certain wattages. The only way to meet this problem is through an overall increase of output of electric lamps and rationalisation of differentials. Since that has already been indicated this problem of variations in demand can be met in the long run. Initially the proportions in which the low wattage vacuum lamps should be made may be determined on the basis of the existing pattern of demand. Thereafter with the envisaged increase in output only marginal adjustments may be needed and that could be easily made.

13.4.2. The principle of reserving one-third of the output for low wattage lamps may not be suitable for all time because there is no inflexibility in the relative demand for lamps of different wattages. We were told that power cuts in certain areas focussed demand on low wattage lamps and that at the early stages of rural electrification new consumers favoured low wattage lamps. At the same time in terms of lumens for overall lighting needs, higher wattage lamps are considered cheaper. With the increase in national income and improvement in the living conditions, demand proportions are bound to change. It may even change from a demand for GLS lamps to a demand for fluorescent tubes. In the circumstances a more feasible method of meeting the situation is to increase output of all lamps and adjust proportions on the assumption of a gradual increase of demand in favour of high wattage lamps.

13.4.3. While such adjustment may be possible in respect of a natural change in demand it would not only be difficult but also cause unnecessary annoyance if the trade initiates a change in consumer demand to earn a larger profit on their sales. Sale of higher wattage lamps yields a larger margin according to the existing differentials in prices. So there exists an incentive for trade to initiate such a change in demand. Variations in demand therefore are not always genuine.

13.5. There has been a greater scarcity of fluorescent lamps than even GLS lamps. While there is a great disparity at present between the supply of and the demand for fluorescent lamps we are informed that one of the two main plants which has already established production of fluorescent tubes, namely, Hind Lamps is not given enough raw materials to work more than one shift. For an immediate increase of supply this plant should be enabled to work double shift. Possibility of operating these plants for a third shift may also be explored. If any more output could be secured by the operation of extra shifts by other producers with modern equipment the necessary facilities in the form of foreign exchange must be provided to them. To justify further licensing of capacity in the case of fluorescent lamps two factors may have to be kept in view. In the first place, new licences must be granted to plants which would produce fluorescent lamps by exclusively blowing their own tubes. It is not necessary that such plants must also have equipment to manufacture GLS lamps. In the second place, new licences for fluorescent lamps may be granted to existing plants producing GLS lamps for the sake of diversifying their production in order to cover their overheads. But this latter alternative may be used sparingly as such plants would always make a demand for glass tubes which may not be easy to satisfy until an independent plant is set up for the manufacture of components. The freight and breakage incidence on tubes is so high that a rational location of tube manufacture on a regional basis may alone fetch some economies.

14. Fair selling prices.

14.1.1. The crux of the problem seems to be the sale of electric lamps at reasonable prices to the consumers. At present in the industry there is no organised attempt to correlate the producer's price with that of the retailer. According to the existing practice prices are published by the ELMI-Hind group's sales organisations. On the basis of these prices the ILFA organisation advertises its prices for its own units. As already observed, at certain ranges the ILFA prices are lower and at others they are at par with those of ELMI-Hind group. The ILFA prices are rarely higher than those of the ELMI-Hind group. The producers have explained that the increase of prices from time to time is due to the imposition and increase in the excise duty levied on electric lamps. An excise duty on lamps was initially imposed in 1955 and it was subsequently increased in 1960. It is complained that the increase in the prices particularly of higher wattage lamps from April 1961 was due to the imposition of excise duty on glass shells. It may not be correct to attribute the high prices entirely to the levy of excise duties even though the cumulative levy of excise duties on certain components and process materials in addition to excise on the finished product may have that effect. Even if excise duties are excluded for the purpose of calculation it is observed that the prevailing prices are high in relation to costs of production.

14.1.2. Several reasons are adduced by the manufacturers as an explanation of the existing high prices. It is said that the cost of production has risen owing to increase in wages and salaries and the rise of overhead expenses. It is also stated that the excise duties on raw materials and components add to their cost of production. During recent years they have had to provide for profit bonus and make higher provisions for development rebate. Besides, the Central sales taxes are also said to add to the high retail prices.

14.1.3. The consumers of electric lamps complained that the prevailing market prices are much higher than the list prices published by the producers. It is said that on certain occasions they are higher by even 50 per cent. Even the Director-General of Supplies and Disposals has stated that whenever they are compelled to buy lamps in open market they have had to pay very high prices. Right at the time of our inquiry we found that market prices of GLS lamps were higher than list prices. This, of course, has to be attributed to the absence of both price control and distribution control at the retail end.

14.2.1. Apart from the irregularities at the retail end there is a conspicuous difference between the ex-factory prices at which the lamps are obtained by the selling organisation of the ELMI-Hind group and their own list of selling prices. The margin is excessive even considering the special arrangements which exist between ELMI and its selling organisations. The former charges in addition to the ex-factory prices which include excise duty, all subsequent expenses for packing, despatch and freight on lamps. The selling organisations incur the bulk of the sales and advertisement charges and while fixing agreed price lists for different brands do not notify trade prices for the distributors. It is seen that the various additions made to the ex-factory prices of lamps are all on the high side. The charges of cartons are high, the expenses on packing are high and the 5 per cent allowance on breakage is unjustifiable. So there seems to be scope for reduction of all these items even if the ex-factory cost of production is considered reasonable.

14.2.2. The examination of manufacturing costs has shown that there is scope for reduction of costs, the benefit of which may be ultimately passed on to consumers. We have indicated one way in which this could be done if efficient producers with high cost modern equipment are allowed maintenance imports essential for second shift working which may secure some reduction in overheads. There is also scope for economy by switching over to use of cheaper components or raw materials like aluminium instead of brass for caps. In respect of G.L.S. lamps while ELMI-Hind have standardised shell sizes up to 100 watts, other manufacturers have yet to fall in line to secure an economy in cost by using smaller shells. Packing charges of lamps also form a substantial percentage of their costs. The high cost of paper, etc., and excise thereon and the need for heavy packing to meet rough handling are given as reasons for this. A degree of utility in design and material could ensure, without sacrificing safety of goods, economy in wrappers and cartons for domestic consumption which should not call for any great sales appeal in present market conditions. As pointed out earlier, refixation of differentials on a basis more directly related to producer's costs could also secure some reduction in ex-factory price. While manufacturers have claimed that lamp prices have been maintained over a period or increased only to the extent of the excise levy, all the small economies indicated above may in the aggregate help to off-set or absorb the present tax incidence to which extent the consumer could benefit.

14.3. The existing pattern of price differentials does not appear to be fully justified. Prices rise with wattage at rates more than what is warranted by differences in producer's costs. Obviously it seems to be based on the principle of charging what the traffic will bear. Those who purchase higher wattage lamps are presumed to be higher income groups who could be made to pay a proportionately higher price not only for the lamps but also on the recurring expense for electricity. The charging of such discriminatory prices would be a sign of monopoly. If there existed perfect competition among the producers such discrimination would not have been possible. With the standardisation of same size shells from 25 to 100 watts the cost differentials are negligible. Consequently the existing price differentials are artificially maintained to exploit the market. Except the difference in prices of shells for higher wattages, where use of smaller size shells has not yet been adopted, there are no other items of cost justifying a higher price for lamps of higher wattages. Therefore the system of differential prices upto 100 watts ought to be discontinued. Till the units in the ILFA group standardise the use of shells the cost difference due to the variations in the size of shells used may be permitted. After the ILFA group have standardised the size of the shells there could be no further justification for differential prices. The abolition of such artificial differences will also take away the incentive to induce the market demand to shift to higher wattage lamps. Such differentials do not exist in the United Kingdom. The Commission received information from the High Commissioner in the U.K. regarding such differentials. We are given to understand that the same price is charged in the U.K. for GLS lamps upto 100 watts. We also understand that in some West European countries leading brands are sold in chain stores at almost the same list prices. Taking all this into consideration we have recommended differentials based on costs as shown in the price tables appearing after the next paragraph.

14.4. The wide margin between ex-factory and retail list prices, even allowing for the fact that the latter are generally inclusive of freight and in some cases excise duty, is *prima facie* excessive in comparison with that for other consumer goods under price control. Discounts of 35 to 45 per cent on retail or list prices are allowed by ILFA units whose costs are higher than those of ELMI. There is also a very wide margin between the price at which ELMI-Hind group sell their products to their constituents and the list prices at which the latter retail them. Such large discounts are also reported to exist in overseas markets. We are of the view that having regard to the existing conditions in this industry and its distribution trade, a discount of 37½ per cent calculated on the retail or list prices which are publicised would provide a reasonable margin for the distribution chain. Retail selling prices which have been calculated accordingly and the fair factory prices (f.o.r. destination basis) determined by us are shown side by side in the table given below. We recommend that the prices set out

Statement of fair prices for future

(*Rs. per* 100 *lamps*)

	CLEAR		FROSTED		DAY LIGHT		RED		BLUE		GREEN	
	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair factory selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination basis)	Fair retail selling price rounded off to next higher rupee
I. (a) *GLS LAMPS*												
15 Watts	58·40	94	61·86	99	..	..	89·99	144	83·75	134	80·98	130
25 ,,	61·57	99	65·73	106	84·71	136	93·71	150	86·09	138	84·71	136
40 ,,	62·66	101	66·82	107	85·80	138	94·80	152	87·18	140	85·80	138
60 ,,	63·78	103	67·94	109	86·92	140	95·92	154	88·30	142	86·92	140
75 ,,	72·33	116	77·18	124	97·27	156	..	..	..	..	..	..
100 ,,	73·66	118	78·51	126	98·60	158	..	..	..	..	..	..
150 ,,	114·64	184	121·41	195	..	..	..	..	..	..	..	..
200 ,,	137·09	220	145·22	233	..	..	..	..	..	..	..	..
I. (b) *HIGH WATTAGE*												
300 Watts	240·70	386	..	..	..	..	..	..	..	..	..	..
500 ,,	369·33	591	..	..	..	..	..	..	..	..	..	..
1000 ,,	561·18	898	..	..	..	..	..	..	..	..	..	..
1500 ,,	751·25	1,202	..	..	..	..	..	..	..	..	..	..
I. (c) *TRAIN LIGHT*	61·84	..	65·30	..	..	..	..	..	..	..	84,00	..
I. (d) *LOCO HEAD LIGHT*	348·24	..	..	..	..	..	..	..	..	..	..	..

(*Rs. per* 100)

	DAY LIGHT		WHITE	
	Fair factory price (f.o.r. destination)	Fair retail selling price rounded off to next higher rupee	Fair factory price (f.o.r. destination)	Fair retail selling price rounded off to next higher rupee
II. *Fluorescent Tubes*				
2′ 20 Watts	242·76	389	247·31	396
4′ 40 Watts	318·62	510	327·08	523
5′ 80 Watts	408·72	654	419·12	671

	Fluorescent Fair factory price per lamp* Rs.	Non-Fluorescent Fair factory price per lamp* Rs.
III. *High Pressure Mercury Vapour Lamps.*		
80 Watts	30·42	29·10
125 Watts	31·67	30·12
250 Watts	42·29	40·36
400 Watts	55·22	52·90
700 Watts	90·81	86·91
1000 Watts	110·26	105·14

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	Fair factory price* Rs. per 100	Fair retail selling price rounded off to next higher rupees Rs. per 100
IV. *Miniature Lamps*		
(a) Torch (all type including prefocus)	15·62	25
Radio dial map lamp. . .	26·01	42
(b) *Auto Lamp-Head Light*		
Bosch Type 6 & 12 Volts 36/36.	81·22	130
Cap & Shell—24 Volts 36/36 .	86·87	139
Prefocus Type—6 & 12 Volts 36/36	97·77	157
Cap & Shell—24 Volts 36/36 .	104·00	167
Tail Lamp and side lamp with double fillament 6, 12 & 24 Volts .	52·02	84
Tail Lamp and side lamp with single filament 6, 12 & 24 Volts . .	45·56	73

NOTE.—(a) For lamps upto 100 Watts, the prices are for single coil filament lamps. For coiled coil and reinforced coil lamps of these wattages Rs. 1·88 for ex-factory and Rs. 3 for retail prices are to be added.

(b) Prices for torch lamps are ceiling prices.

*f.o.r. destination.

in the table may be taken as the fair retail selling prices. These prices are exclusive of Union excise and State and local levies, but include such duty on glass shells or other materials used in the process of production. In the case of high pressure mercury vapour lamps and automobile lamps, as there is a wide coverage of types and designs, the prices that we have given for the types mentioned may be taken only as indicators for the reasons explained earlier. While they cannot be applied automatically to all types with the same end use, they may be helpful in determining whether a range of variation is fair having regard to costs as distinct from exploiting the consumer's capacity to pay. We have not attempted to fix prices for decorative lamps, such as pigmy and candle lamps as they are either not widely used or are items of luxury.

14.5. As new manufacturers of glass shells, brass caps and other special components come up and when increased capacity for manufacture of various kinds of electric lamps come into operation in the near future the prices that we now recommend may need revision. We, therefore, recommend that the prices suggested by us in the four lists may be continued only for the next three years. A fresh inquiry should be undertaken well before that period and prices revised taking into account changed conditions in the industry, if it is desired to continue price control in any form.

14.6. As at present in the absence of statutory control over prices, we consider that for the proper observance of published list prices, it is essential that producers and distributors in contractual relationship with them should implement faithfully our recommendations made in paragraph 12.4.2.

15. Ancillary recommendations.

15.1.1. Apart from the recommendations made in their relevant contexts we wish to mention a few suggestions of a general nature for a gradual reorganisation of the industry which would help to bring down prices. In paragraphs 9.2.3. and 13.1. we have dealt with enhancement of output in the short period by enabling shift working. Beyond permitting a partial second shift operation of the plant for GLS lamps no further expansion of the ELMI-Hind group is needed for raising output.

15.1.2. In the future set-up of the industry there should be an independent unit for making components. Since the medium-sized units for the production of GLS lamps could be economic, the setting up of a centralised unit for shells and caps is desirable. The policy of decentralisation of the industry can also be furthered by this means. If the existing small units are progressive in their techniques they could bring down their cost of production when the supply of components is assured.

15.2. The glass factories in the country may be consulted as to what stands in the way of their taking up production of shells for the lamp industry. If willing, one of them could be licensed to instal a plant for making shells for GLS lamps and a horizontal type of tube making plant for fluorescent lamps.

15.3. A survey should be made of units that are definitely uneconomic in operation owing to their inefficient machinery. To foster the existence of high cost units would be a burden on the community and consumers should not be made to pay high prices for ever.

15.4.1. At the public inquiry it was brought to our notice that there was a wide gap between licensed and installed capacity in the industry. We suggest that licences issued for expansion or installation of new units and not implemented beyond a reasonable period should be cancelled and re-allocated to other existing units. Non-utilisation of licences should not be allowed to become an effective method of preventing others from developing. Parties to whom licences have been recently issued should be hastened to implement them. If it is noticed that they are lacking either in financial resources or in technical knowledge the licences should be revoked.

15.4.2. No further licensing for the manufacture of lamps would be desirable unless the parties are assured of the supply of components such as shells, tubes and caps. At present the question of matching the output of GLS lamps with the availability of components does not seem to have received adequate consideration of the licensing authorities.

15.5. In paragraph 13.3.2. we have referred to the substitution of aluminium for brass in making lamp components. Sooner or later the industry may have to face an inadequacy of the supply of material for the manufacture of brass caps. Therefore unless immediate steps are taken for the change over from brass to aluminium for the purpose, the industry will be in a difficult situation with the expansion of output that is recommended. We, therefore, suggest that the aluminium industry should take steps to provide strips of the required quality for cap making to the industry; the relative costs and the adequacy of supply to satisfy the needs of the industry may be examined in this connection.

15.6. The lamp industry still stands in need of several imported components. This has to be overcome to attain self-sufficiency, raise output and lower the costs. Therefore we recommend that steps should be taken early to help production within the country of the other raw materials like rods, lead-in-wires, tungsten filament, etc.

15.7. We have collected information from overseas countries like the U.K. and Holland and find that the 60 mm. shell has been standardised for 25 to 100 watt lamps. ELMI and Hind have switched over to the use of 60 mm. shell for 75 and 100 watt lamps since 1st January 1962. Philips is also using the same size shell since it went into production in February 1962. In view of the practice in the overseas countries, the switch-over already effected by ELMI, Hind and Philips which are responsible for more than 60 per cent of the production in the country and the substantial economies in the cost of production, we recommend that all the other producers should take immediate steps to use 60 mm. shell for 75 and 100 watt lamps also. Such a change-over would also encourage the use of coiled coil filament for these lamps which as explained in paragraph 11.3.7. have better lighting efficiency.

15.8. The standards laid down by the Indian Standards Institution have indicated the maximum diameter of the bulbs for these categories of electric lamps as 71 mm. As only the maximum diameter has been specified it would not preclude the use of 60 mm. shell for 75 and 100 watt lamps. However, as this may create some confusion, (we are informed by the Bengal Lamps that the Director-General of Supplies and Disposals is not accepting 60 mm. for 75 and 100 watt lamps), we recommend that the Indian Standards Instiution should clarify the points and consider revision of this specification so as to make acceptance of 60 mm. shells as permissible within the standards.

Our conclusions and recommendations may be summarised as under :—

16. Summary of conclusions and recommendations.

16.1. The scope of the present inquiry, the first in respect of electric lamps, covers fixation of fair prices for almost all types of electric lamps manufactured in the country and measures by which rise in prices can be checked.

[Paragraph 2.1]

16.2. The annual installed capacity for GLS and allied lamps and fluorescent tubes was 62.60 and 3.30 millions respectively towards the end of 1962. Their actual production was 44.97 and 2.10 millions in 1961 and 25.18 and 1.51 millions in the first half of 1962 respectively. The annual installed capacity for miniature and other allied lamps was 28.75 millions in the organised sector and 23.87 millions in the small-scale sector, production during 1961 being 25.78 and 2.13 million in the organised and small-scale sectors respectively.

[Paragraphs 4.2.1 and 4.2.3]

16.3. The demand for GLS lamps and other allied lamps, fluorescent tubes and miniature lamps in 1961-62 is estimated at 49, 3.5 and 34 millions respectively while the estimates of demand in 1965-66 including 10 per cent target for exports, work out to 95, 8.8 and 55 millions respectively.

[Paragraphs 6.1 and 7.3.1]

16.4. There is scope for exports to South East Asia and Middle East countries particularly by some of the lower cost units who also maintain quality and standards. For augmenting exports, incentives apart, internal output must be raised to bring down costs and further progress made in the manufacture of components within the country. Our cost figures for ELMI, which mainly uses low priced machine blown glass shells, show that margin between producer's costs and export prices would be negligible if full rebate is allowed of all the excise and import duties. The grant of additional exchange for imports of raw materials for second shift working of ELMI and Hind should justifiably be tied up with an obligation to export. ELMI and Hind will be well fitted to discharge the responsibility of export since the quality of their products is upto international market standards.

[Paragraph 8.2]

16.5. As a first measure for stepping up production in the short period and bringing down costs, one of the automatic lines of ELMI-Hind group engaged in the production of GLS lamps may be enabled to operate a second shift. Gradually other lines may also be pressed into service on a phased basis. Similarly some additional foreign exchange for maintenance imports should also be given for other units which have already installed modern automatic equipment and can work partially on second shift. This would automatically obviate the licensing of any new capacity intended for single shift operation which is a promoting cause of high costs.

[Paragraphs 9.2.3 and 13.1]

16.6. As a long range measure the authorities should make a careful assessment of the excess capacity in the industry. The bottlenecks in the utilisation of such capacity by modernised units should be ascertained and increased production ought to be permitted.

[Paragraph 13.1]

16.7. There has been greater scarcity of fluorescent lamps than even GLS lamps. For an immediate increase of supply, Hind Lamps should be licensed to work double shift. Possibility of operating plants for fluorescent lamps for a third shift may also be explored.

[Paragraph 13.5]

16.8. As a matter of policy small units may be encouraged to develop the manufacture of miniature lamps which cannot be standardised on the production side in view of their smaller and specialised demand.

[Paragraph 7.3.3]

16.9. Initially the proportion in which the low wattage vacuum lamps should be made may be determined on the basis of existing pattern of demand. Thereafter with the envisaged increase in output only marginal adjustments may be needed. The principle of reserving one-third of the output for low wattage lamps may not be suitable for all times because there is flexibility in the relative demand for lamps of different wattages.

[Paragraphs 13.4.1 and 13.4.2]

16.10. Setting up of separate units as are already licensed for manufacturing components should be expedited and possibility of setting up of special units for making glass shells and glass tubes should be explored further.

[Paragraphs 13.3.1 and 13.3.2]

16.11. In the context of restricted availability of brass strips the Department of Technical Development should examine the difficulties of substituting aluminium for brass in the manufacture of caps and concert measures for co-ordinating the needs of cap manufacturers with the aluminium industry.

[Paragraphs 7.2.3, 13.3.2 and 15.5]

16.12. The electric lamp industry still stands in need of several imported components like rods, lead-in-wires, tungsten filament, etc. Steps should be taken to help production of such components early within the country. The indigenous manufacture of glass tubes for blowing miniature shells and caps for miniature lamps needs to be encouraged.

[Paragraphs 7.3.3 and 15.6]

16.13. Indigenous producers should become quality conscious and strict adherence to standards laid down and the setting up of facilities for testing the quality of the lamps ought to be made a condition precedent to further expansion of production in any plant. Quality has particularly to be maintained if export markets have to be developed.

[Paragraph 7.5]

16.14. Producers do not have a monopoly in the present selling arrangements but price leadership of ELMI-Hind products prevails. Producers do not at present take responsibility for seeing that prices as per published lists are observed. The practice of stamping prices on lamp cartons already adopted by some producers should be generally followed and retail prices should, to the extent possible also be stamped on lamps in order that there could be better control over re-sale prices.

[Paragraphs 12.2.1, 12.3 and 12.4]

16.15. The manufacturers should through agreements with selling agents and distributors ensure some control over margins so that the retail prices are effectively implemented in the interest of consumers.

[Paragraph 12.4.2]

16.16. The system of differential prices upto 100 watts, which is not warranted by differences in producers' costs, does not appear to be fully justified and ought to be discontinued. Till the units in ILFA group standardise the use of shells the cost difference due to the variations in the size of shells used may be permitted. After the ILFA group have standardised the size of the shells there could be no further justification of differential prices.

[Paragraph 14.3]

16.17. Having regard to the existing conditions in this industry and its distribution trade, a discount of 37½ per cent calculated on the retail or list prices which are publicised would provide a reasonable margin for the distribution chain.

[Paragraph 14.4.]

16.18. The fair prices of (i) GLS lamps and train lamps, (ii) fluorescent tubes, (iii) high pressure mercury vapour lamps and (iv) miniature lamps, as determined by us, are given in the statement under paragraph 14.4. These prices are exclusive of Union excise and State and local levies, if any, but include such duties on glass shells and other materials used in the process of production. The prices suggested by us should be in force for three years. A fresh inquiry should be undertaken well before the expiry of this period.

[Paragraphs 14.4 and 14.5]

16.19. In the case of high pressure mercury vapour lamps and automobile lamps as there is a wide coverage of types and designs, the prices that we have given for types mentioned may be taken only as indicators.

[Paragraph 14.4]

16.20. As the existence of high cost units would be a burden to the community, a survey should be made of units that are definitely uneconomic in operation owing to their inefficient machinery.

[Paragraph 15.3]

16.21. There is a wide gap between the licensed and installed capacity in the industry. Licences issued either for expansion of the existing capacity or for installation of new units, if not implemented beyond a reasonable period, should be cancelled and allocated to other existing units. Parties to whom licences have been recently issued should be hastened to implement them. If they are lacking either in financial resources or technical knowledge, the licences should be revoked.

[Paragraph 15.4.1]

16.22. No further licensing for the manufacture of lamps would be desirable unless such parties are assured of regular supplies of components such as shells, tubes and caps.

[Paragraph 15.4.2]

16.23. In view of the practice in overseas countries, the switch-over already effected by ELMI, Hind and Philips and the possible substantial economies in the cost of production, all other producers should take immediate steps to use 60 mm. shells for 75 and 100 watt lamps also.

[Paragraph 15.7]

16.24. The Indian Standards Institution should consider a revision of its present specification for glass shells so as to make acceptance of 60 mm. glass shells as permissible within the standards.

[Paragraph 15.8]

Acknowledgements.

17. We wish to thank the representatives of producers, distributors and consumers and Government Departments concerned who furnished us with valuable information in connection with this inquiry and gave evidence before us.

K. R. P. AIYANGAR,
Chairman.

J. N. SEN GUPTA,
Member.

R. BALAKRISHNA,
Member.

PRAMOD SINGH,
Secretary.
Bombay, dated 13*th March,* 1963.

APPENDIX I

[*Vide* paragraph 1.2.1]

No. EEI-4(20)/60

GOVERNMENT OF INDIA

MINISTRY OF COMMERCE AND INDUSTRY

New Delhi, the 11th May, 1961.

FROM

Shri K. N. Shenoy,
Deputy Secretary to the Government of India.

To

The Secretary,
Tariff Commission,
C. G. O. Building,
101, Queen's Road,
Bombay-1.

SUBJECT : *Rise in prices of electric lamps and fluorescent tubes*

SIR,

I am directed to say that several representations were received from various Associations that there was shortage of low wattage lamps and fluorescent tubes and consequently rise in prices of electric lamps and consequently that the restriction on the import of these lamps should be relaxed.

The position was that, generally speaking, prices of lamps were not being advertised by some of the manufacturers. This question was discussed in the Development Council for Light Electrical Industries and the Council recommended that all units should produce at least 1/3 of their production in low wattage vacuum lamps and that in order high prices are not charged to the customer by the dealers, the manufacturing organisations concerned should give wide publicity about retail selling prices of their products.

The recommendation of the Development Council was accepted by Government and to overcome the present shortage and rise in prices in the low wattage electric lamps, the lamp manufacturers were advised that :

(a) at least 33 1/3 of the total production of GLS lamps , should be in the category of low wattage vacuum lamps. This step would restore the pattern of production obtaining a few years ago when there was no shortage.

(b) the lamp manufacturers should advertise the list of prices of lamps and fluorescent tubes manufactured by them. This will ensure that the consumers are not charged excessively by the retailers or dealers taking advantage of the shortages.

In order to overcome the shortages of electric lamps and fluorescent tubes in the country a few more schemes have been approved by Government. Efforts are being made to increase allocation of foreign exchange to the electric lamps industry for further utilisation of plant and machinery already installed. The Electric Lamp Manufacturers (India) Private Ltd., Calcutta and Hind Lamps Private Ltd., Shikohabad have been given additional raw materials to utilise their existing capacity to the full. With this overall increase in the production, there will be no serious shortage of electric lamps.

सत्यमेव जयते

M/s. Electric Lamp Manufacturers of India Ltd., are the largest manufacturers of electric lamps but the factory does not sell their products in the market. The sales are made by the various sales organisations such as M/s. Philips, General Electric Co. of India, Associated Electrical Industries, Crompton etc., who are partners of the firm. M/s. Philips, G. E. C., A. E. I. etc., have advertised their prices and they are all having a common price. Other lamp manufacturers have also advertised their prices. The retail prices of the brands such as Kiron, Pradip, Asia, Calcutta and Bengal (these are all Indian brands) are shown in the attached sheets. The retail prices of the lamps produced by the Indian section of the lamp industry and the retail prices of the ELMI-Hind group are, by and large of the same order.

Since a number of representations about the rise in prices of electric lamps including fluorescent tubes and miniature bulbs such as have automobile bulbs, torch bulbs, cycle dynamo bulbs and radio panel bulbs have been received, the Tariff Commission is requested to investigate the cost structure under Section 12(d) of the Tariff Commission Act, 1951 and recommend fair selling prices of various typs of electric lamps at an early date.

Yours faithfully,
(Sd.) K. N. SHENOY,
Deputy Secretary to the Government of India.

सत्यमेव जयते

OSRAM

the Light that charms

A PRODUCT OF G. E. C.—CURRENT RETAIL PRICES

General Lighting Service

Watts	CAP	Type	Each		
			Glear	Pearl	Silver Light
			Rs. P.	Rs. P.	Rs. P.
		Volts, 110, 220, 230 & 250			
15	BC/ES	Vacuum, Single Coil	1·25	1·25	..
25	..	Vacuum, Single Coil	1·25	1·25	..
40	..	Gasfilled Coiled Coil	1·44	1·44	1·62
60	..	Gasfilled Coiled Coil	1·56	1·56	1·75
75	..	Gasfilled Coiled Coil	1·81	1·81	2·06
100	..	Gasfilled Coiled Coil	2·00	2·00	2·25
150	..	Gasfilled Single Coil	3·50	3·50	3·94
200	..	Gasfilled Single Coil	5·12	5·12	5·75

Fluorescent Tubes

Size	Watts	CAP	Colour	Each Rs. P.
2 ft.	20	Bi-Pin	4200° K White/6500° K Daylight	7·81
4 ft.	40	Bi-Pin	4200° K White/6500° K Daylight	9·69
5 ft.	80	B.C.	4200° K White/6500° K Daylight	14·56
4 ft.	40	Bi-Pin	4200° K White/6500° K Instant Start	10·75
5 ft.	80	B.C.	4200° K White 6500° K Instant Start	15·62

Including excise duty but excluding Sales Tax and any other local taxes.

THE GENERAL ELECTRIC COMPANY OF INDIA PRIVATE LTD.

COPY

CONSUMER'S RETAIL PRICES

(Inclusive of Excise Duty)

General Service Electric Lamps (*Clear*)

(110, 230 and 250 Volts)

Watt	Price (per piece) Rs. P.	Watt	Price (per piece) Rs. P.
15	1·31	150	3·40
25	1·31	200	5·00
40	1·44	300	6·34
60	1·56	500	9·80
75	1·81	750	14·75
100	2·00	1000	16·64

(Sales Tax and other taxes extra)
Published in Consumer's interest.
By
BENGAL KIRON PRADIP ASIA CALCUTTA

In case of difficulty, please contact manufacturers of the above brand.

APPENDIX II

[*Vide* paragraph 3.1]

List of firms, bodies and Government Departments to whom the Commission's questionnaires/letters were issued and from whom replies or memoranda were received.

*Indicates those who have replied.

@Indicates those who have stated that they have no comments to offer.

A. PRODUCERS (*Large-scale*) :

*1. Electric Lamp Manufacturers (India) Pvt. Ltd., 1, Taratolla Road, Garden Reach, Calcutta-24.
*2. The Bengal Electric Lamp Works Ltd., 137, P. G. H. Shah Road, Jadavpur, Calcutta-32.
*3. The Mysore Lamp Works Ltd., Old Tumkur Road, Post Science Institute, Bangalore-12.
*4. Philips India Ltd., 7, Justice Chandra Madhab Road, Calcutta-20.
*5. Pradip Lamp Works, P. O. Begumpur, Patna-9.
*6. Bharat Electrical Industries Ltd., 52, Hindusthan Buildings, 6-A, SM Banerjee Road, Calcutta-13.
*7. Hind Lamps Ltd., Shikohabad, Uttar Pradesh.
*8. The Calcuta Electric Lamp Works Ltd., 3, Mangoe Lane, Calcutta-1.
*9. Bijlee Products (India) Pvt. Ltd., 36, Lamington Road (North), Bombay-8.
10. The Bharat Electric Bulb Works Ltd., 19, Dum Dum Road, Calcutta-30.
*11. Hindusthan Lamps and Fluorescent Tubes Ltd., P88/4, Incinerator Road Alipore Calcutta-27.
*12. Auto Lamps Ltd., 6, Alipur Road, Post Box 1741, Delhi-8.
*13. Asia Electric Lamp Co. Pvt. Ltd., 45, Durga Charan Mukherjee Street, Calcutta-3.
*14. Shankar Miniature Bulb Industries Pvt. Ltd., 8, Hardwar Road, Dehra Dun·
*15. The Miniature Bulb Industries of India, 131, Kanwali Road, Dehra Dun.
*16. Glass and Miniature Bulb Industries, Behari Niwas, Kanpur.
*17. Lumina Electrical Industries, Bhawanishankar Cross Road, Dadar, Bombay-28.
*18. B. Chowdhury & Co., Indian Globe Chambers, Fort Street, Bombay-1·

B. PRODUCERS (*Small-scale*):

*1. Bagla Miniature Bulb Industries, 55/115, General Ganj, Kanpur.
*2. Jain Miniature Bulb Industries, 52/39, Dalmandi, Kanpur.
@3. The Pioneer Automobile Co., P-39, Princep Street, Calcutta-13.
*4. Sunder and Kapoor, 107, Commerce House, Medows Street, Bombay-1
*5. Orient Electric Lamp Works (Pvt.) Ltd., 1/4A, Dum Dum Road, Calcutta-2
@6. Vidyut Sahakari Mandali Ltd., 1887, Sadashiv Peth, Natuba, Poona-2.
*7. Associated Indian Electricals, 78/1, Maharaja Tagore Road, Calcutta-31.
*8. Tube Light Starter Manufacturing Co., 3/2, Bhagwan Ganguli Lane, Howrah, West Bengal.

*9. M/s. H.M. Vakharia, 514, Raviwar Peth, Poona-2.
*10. Hindusthan Miniature Bulbs Mfg. Co., 47, Lytton Road, Dehra Dun.
11. Jupiter Electricals, Industrial Estate, P.O. Sadakat Asram, Patna-10.
*12. Bishambar Dayal Shri Niwas, Firozabad, Uttar Pradesh.
*13. Shri Mahavir Lamp Works, 73, Factory Area, Fazalganj, Kanpur.
*14. Rakesh Bulb Industries, 7, Tadiwalla Road, Poona-1.
*15. Eskay Industries, Ghodbunder Road, Dahisar, Bombay.
16. Everlite Lamp, 87/171, G.T. Road, Kanpur.
*17. Sunkap Lamps, Dr. Dasture Building, Dadar, Bombay-14.

C. PRODUCERS ASSOCIATION :

* Indian Lamp Factories Association, P-11, Mission Row Extension, Calcutta-1.

D. PROSPECTIVE PRODUCERS :

*1. Bharat Electric Co. Ltd., Post Box No. 16, Main Road, Trivandrum.
*2. Tube Suppliers Ltd., Post Box No. 60, 6, Armenian Street, Madras-1.
*3. Zenith Lamps & Electricals Ltd., 366, Thiruvothiyur High Road, Madras-21.
*4. Laxman Engineering Industries, 15/1, Asaf Ali Road, New Delhi.
@5. Leuna Lamp Ltd. (P.G. Vaishnav), Bulsroyce Colony, Building No. 2, Santacruz East, Bombay-55.
*6. Geep Flashlight Industries Ltd., 28, South Road, Allahabad-1.

E. CONSUMERS :

*1. The Municipal Commissioner, Bombay Municipal Corporation, Bombay.
*2. The Municipal Commissioner, Ahmedabad Municipal Corporation, Ahmedabad.
*3. The Commissioner, Corporation of Madras, Madras.
*4. The Commissioner, Corporation of Calcutta, Calcutta.
*5. The Commissioner, Corporation of Delhi, Delhi.
*6. Heavy Engineering Corporation Ltd., P.O. Hinoo, Ranchi.
*7. Heavy Electricals (India) Ltd., Post Box No. 46, Bhopal.
*8. Fertilizer Corporation of India Ltd., Sindri Unit, Dhanbad (Bihar).
*9. Hindusthan Machine Tools Ltd., Jalahalli P.O., Bangalore.
*10. Indian Telephone Industries Ltd., Duravani Nagar P.O., Bangalore.
*11. Hindustan Insecticides Pvt. Ltd., Industrial Area, Rohtak Road, New Delhi-15.
*12. Hindustan Antibiotics Ltd., Pimpri (Near Poona).
*13. The Praga Tools Corporation Ltd., Post Box No. 70, Secunderabad.
14. Director General of Civil Aviation, New Delhi.
*15. The Controller of Stores, Central Railway, Bombay-1.
*16. The General Manager, Eastern Railway, Calcutta.
*17. The Controller of Stores, Northern Railway, Baroda House, New Delhi.
*18. The Controller of Stores, Western Railway, Churchgate, Bombay-1.
*19. The General Manager, Southern Railway, Perambur, Madras-23.
*20. The Chairman, Bombay Port Trust, Bombay.
*21. The Chairman, Madras Port Trust, Madras.
22. Commissioners for the Port of Calcutta, Calcutta.

*23. The B.E.S. & T. Undertaking, Best House, Bombay-1.

*24. The Tata Engineering and Locomotive Co. Ltd., Bombay House, 24, Bruce Street, Bombay-1.

*25. Ashok Leyland Ltd., Bank of Mysore Building, N. S. C. Bose Road, Madras-1.

*26. Hindustan Motors Ltd., 8, India Exchange Place, Calcutta-1.

@27. Mahindra & Mahindra Ltd., Gateway Building, Apollo Bunder, Bombay-1.

*28. The Tata Iron & Steel Co. Ltd., 24, Bruce Street, Bombay-1.

*29. Hindustan Steel Ltd., Bihar Secretariat Building, P.O. Hinoo, Ranchi.

@30. Indian Iron & Steel Co. Ltd., Esplanade House, Waudby Road, Bombay-1.

*31. The Associated Cement Co. Ltd., 121, Queen's Road, Bombay-1.

@32. Burmah-Shell Oil Storage & Distributing Co. of India Ltd., Burmah-Shell House, Ballard Estate, Bombay-1.

*33. Devidayal Metal Industries, Gupta Mills Estate, Bombay-10.

*34. Glaxo Laboratories (India) Pvt. Ltd., Worli, Bombay-18.

*35. Voltas Ltd., 19, Graham Road, Ballard Estate, Bombay-1.

36. Bombay Dyeing & Mfg. Co. Ltd., Neville House, Ballard Estate, Bombay-1.

*37. Kamani Metals and Alloys Ltd., Kamani Chambers, Nicol Road, Ballard Estate, Bombay-1.

*38. The Metal Box Co. of India Ltd., Barlow House, 59-C, Chowringhee, Calcutta-20.

39. Master Electric Stores, Trimbak Gate, Nasik City.

*40. K.C. Desai, 101, Amrit Wadi, Vithalbhai Patel Road, Bombay-4.

@41. Kala Radio Service, 170/C, Khadilkar Road, Bombay-4.

@42. P.G. Vaishnav, Bulsroyce Colony, Building No. 2, Santacruz East, Bombay-55.

*43. The Millowners' Association, Elphinstone Building, Veer Nariman Road, Bombay-1.

*44. Atomic Energy Establishment Trombay, Mohatta Building, Palton Road, Bombay-1.

45. Enfield India Ltd., Post Box No. 5284, Madras-19.

*46. Neyveli Lignite Corporation Ltd., P.O. Neyveli, South Arcot District, Madras State.

*47. Union Carbide India Ltd., 1/3, Brabourne Road, Calcutta-1.

*48. Lighting Equipment & Assessories Manufacturers' Association Ltd., 195/197, Abdul Rehman Street, Bombay-3.

F. DEALERS' ASSOCIATIONS :

*1. The Electric Merchants Association, Vithal Sayana, Building No.2, Lohar Chawl, Bombay-2.

*2. The Electrical Merchants' Association, Sankara Building, Chickpet, Bangalore-2.

*3. U.P. Electric Contractors' Merchants' Association, 37, Gautam Budh Marg, Lucknow.

4. Electric Merchants' Association, C/o Radha Kisan & Co., Avinashi Road, Coimbatore.

5. The Calcutta Electric Traders Association, 12, Lower Chitpur Road, Calcutta-1.

6. Electric Merchants' Association, C/o Shri Krishna Rice Mills Store, Madura.

7. Ahmedabad Electric Merchants' Association, C/o Parekh Electric Co., Ahmedabad.

8. Vijayawada Electrical Dealers' Association, Vijayawada.
*9. The Electrical Merchants Association, Gandhi Bag, Nagpur-2.
10. Madras Electric Traders Association, 11, Linghi Chetty Street, Madras-1.
11. Electric Merchants' Association, Dariba Kalan, Delhi.
12. Delhi Electric Traders' Association, 1751, Bhagat Niwas, Electric Market, Delhi-6.
13. Chandni Chowk Electric Merchants' Association, Delhi.
14. Bhagirath Palace Electric Merchants Association, Chandni Chowk, Delhi.

G. RAW MATERIALS/COMPONENTS SUPPLEIRS :

*1. Kamani Brothers Pvt. Ltd., Kamani Chambers, Nicol Road, Ballard Estate, Bombay-1.
*2. Indian Oxygen Ltd., 5, Mayurbhanj Road, Kidderpore, Calcutta-23.
*3. Sree Saraswathi Smelting & Refining Co., 2124, Link Road, Malleswaram, Bangalore-3.
4. Asiatic Oxygen & Acetylene Co. Ltd., 8, Dalhousie Square East, Calcutta-1.
*5. Saru Smelting & Refining Corporation Pvt. Ltd., Sardhana Road, Near Cantt. Railway Station, Meerut.
*6. Seraikella Glass Works (Pvt.) Ltd., P.O. Konnagar, Distt. Hooghly, West Bengal.
*7. Indian Plastics Ltd., Kandivli, Bombay-67.
*8. Tungsten of India Ltd., United Bank of India Building, Sir P.M. Road, Bombay-1.
*9. Shri N.R. Dasgupta, Post Box 556, C/3, Gillander House, Netaji Subhas Road, Calcutta-1.
*10. Laxman Engineering Industries, 15/1, Asaf Ali Road, New Delhi.
*11. S.V. Subramaniam & Sons, 28, St. Mark's Road, Bangalore-1.
*12. R.S. Traders, 16, People's Building, Sir P.M. Road, Bombay-1.

H. SELLING AGENTS :

*1. Bajaj Electricals Ltd., 45-47, Veer Nariman Road, Bombay.
*2. Philips India Ltd., 7, Justice Chandra Madhab Road, Calcutta-20.
*3. General Electric Co. of India Pvt. Ltd., Magnet House, Chittaranjan Avenue, Calcutta-13.
*4. Associated Electrical Industries (India) Pvt. Ltd., Crown House, 6, Mission Row, Calcutta-1.
*5. Greaves Cotton & Crompton Parkinson Ltd., 4, Mission Row Extension, Calcutta-1.
*6. Crompton Engineering Co. (Madras) Ltd., 2nd Line Beach, Madras.
*7. Allied Lamp Exporters, 45-47, Veer Nariman Road, Bombay.

I. GOVERNMENT DEPARTMENTS :

*1. The Secretary to the Government of India, Ministry of Commerce and Industry, New Delhi.
*2. The Senior Industrial Adviser, Development Wing, Udyog Bhavan, Maulana Azad Road, New Delhi.
*3. The Development Commissioner, Small-Scale Industries, Udyog Bhavan, Maulana Azad Road, New Delhi.
*4. The Director, Indian Standards Institution, Manak Bhavan, Mathura Road, New Delhi.

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*5. The Director of Co-ordination and Statistics, Directorate-General of Supplies and Disposals, National Insurance Building, Parliament Street, New Delhi.

@6. The Secretary to the Government of Madhya Pradesh, Commerce and Industry Department, Bhopal.

*7. The Secretary to the Government of Uttar Pradesh, Industries (D) Department, Lucknow.

@8. The Secretary to the Government of Rajasthan, Industries (A) Department, Jaipur.

*9. The Director of Industries, Government of Punjab, Chandigarh.

*10. The Secretary to the Government of West Bengal, Commerce and Industries Department, Calcutta.

*11. The Secretary to the Government of Maharashtra, Industries and Labour Department, Sachivalaya, Bombay-32.

*12. The Secretary to the Government of Kerala, Public Works Department (Electricity), Trivandrum.

*13. The Secretary to the Government of Madras, Industries, Labour and Co-operation Department, Madras.

*14. The Director of Industries, Himachal Pradesh, Simla.

*15. The Secretary to the Government of Mysore, Commerce and Industries Department, Bangalore.

*16. The Secretary to the Government of Gujarat, Home and Industries Department, Sachivalaya, Ahmedabad-15.

@17. The Director of Industries, Delhi Administration, Delhi.

*18. The Chief Secretary to the Government of Andhra Pradesh, Hyderabad.

19. The Chief Secretary to the Government of Assam, Shillong.

*20. The Chief Secretary to the Government of Bihar, Patna.

21. The Chief Secretary to the Government of Jammu and Kashmir, Srinagar.

*22. The Chief Secretary to the Government of Orissa, Bhubaneshwar.

*23. The Secretary, Engineering Export Promotion Council, India Exchange (7th Floor), India Exchange Place, Calcutta-1.

24. The Director, Government Test House, Alipore, Calcutta.

25. The Counsellor (Commercial) to the High Commission of India in U.K., London, W.C.2.

APPENDIX III

[*Vide* Paragraph 3.1]

List of factories visited by the Commission and other Officers

Sl. No.	Name of unit	By whom visited	Date of visit
1.	Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta.	Shri J. N. Dutta, Member	21st September, 1961.
		Dr. R. Balakrishna, Member.	
		Shri J. N. Sen Gupta, Member.	16th August, 1961.
		Shri Hari Bhushan, Technical Director (Engineering & Metallurgy).	25th April, 1962.
		Shri A. K. Banerji, Asstt. Cost Accounts Officer.	12th to 22nd November, 1962.
2.	Bengal Electric Lamp Works Ltd., Calcutta.	Shri J. N. Dutta, Member	20th September, 1962.
		Shri J. N. Sen Gupta, Member.	16th August, 1961.
		Shri Hari Bhushan, T.D. (E. & M.).	26th-28th April, 1962.
3.	Glass and Miniature Bulb Industries, Kanpur.	Shri J. N. Sen Gupta, Member.	21st September, 1961.
		Shri Hari Bhushan, T.D. (E. & M.).	27th September, 1961.
4.	Auto Lamps Ltd., Delhi	Dr. R. Balakrishna, Member.	16th October, 1961.
		Shri Hari Bhushan, T.D. (E. & M.).	23rd September, 1961.
5.	Hind Lamps Ltd., Shikohabad.	Dr. R. Balakrishna, Member.	22nd October, 1962.
		Shri Hari Bhushan, T.D. (E. & M.).	25th September, 1961.
6.	Bagla Miniature Bulb Industries, Kanpur.	Shri Hari Bhushan, T.D. (E. & M.).	27th September, 1961.
7.	Jain Miniature Bulb Industries, Kanpur.		
8.	Bharat Electrical Industries Ltd., Calcutta.	Dr. R. Balkrishna, Member.	21st September, 1962.
		Shri J. N. Sen Gupta, Member.	6th June, 1962.
		Shri Hari Bhushan, T.D. (E. & M.).	26th-28th April, 1962.

Sl. No.	Name of unit	By whom visited	Date of visit
9.	Calcutta Electric Lamp Works Ltd., Calcutta.	Dr. R. Balakrishna, Member.	22nd September, 1962.
		Shri J. N. Sen Gupta, Member.	6th June, 1962.
		Shri Hari Bhushan, T.D. (E. & M.).	26th April, 1962.
10.	Asia Electric Lamp Co. Pvt. Ltd., Calcutta.	Shri J. N. Dutta, Member	19th September, 1962.
		Shri Hari Bhushan, T.D. (E. & M.).	26th-28th April, 1962.
11.	Bharat Electric Bulb Works Ltd., Calcutta.	Shri Hari Bhushan, T.D. (E. & M.).	26th-28th April, 1962.
12.	Hindusthan Lamps and Fluorescent Tubes Ltd., Calcutta.		
13.	Pradip Lamp Works, Patna	Dr. R. Balakrishna, Member.	20th September, 1962.
		Shri Hari Bhushan, T.D. (E. & M.).	30th April, 1962.
		Shri S. N. Raghavan, A.C.A.O.	22nd to 27th November, 1962.
14.	Mysore Lamp Works Ltd., Bangalore.	Shri K. R. P. Aiyangar, Chairman.	7th November, 1962.
		Dr. R. Balakrishna, Member.	18th August, 1962.
		Shri Hari Bhushan, T.D. (E. & M.).	3rd October, 1962.
		Shri A. K. Ganguli, A.C.A.O.	6th to 12th November, 1962.
15.	S.V. Subramaniam & Sons, Bangalore.	Shri K. R. P. Aiyangar, Chairman.	7th November, 1962.
		Shri Hari Bhushan, T.D. (E. & M.).	3rd October, 1962.
16.	Tube Suppliers Ltd., Madras.	Shri K. R. P. Aiyangar, Chairman.	10th November, 1962.
17.	Bijlee Products (India) Private Ltd., Bombay.	Shri K.R.P. Aiyangar, Chariman.	14th December, 1962.
		Shri J. N. Sen Gupta, Member.	
		Dr. R. Balakrishna, Member.	
		Shri Pramod Singh, Secretary.	
		Shri Hari Bhushan, T.D. (E. & M.).	
18.	Sunder & Kapoor, Bombay	Ditto.	Ditto.
		Shri S. N. Raghavan, A.C.A.O.	2nd January, 1963.

Sl. No.	Name of unit	By whom visited	Date of visit
19.	B. Chowdhury & Co., Bombay.	Shri K. R. P. Aiyangar, Chairman. Shri J. N. Sen Gupta, Member. Dr. R. Balakrishna, Member. Shri Pramod Singh, Secretary. Shri Hari Bhushan, T.D. (E. & M.).	14th December, 1962.
		Shri A. K. Banerji, A.C.A.O.	4th January, 1963.
20.	Lumina Electrical Industries, Bombay.	Shri S. K. Basu, Sr. Cost Accounts Officer.	18th December, 1962.
21.	Philips India Ltd., Bombay	Shri S. K. Basu, S.C.A.O. Shri B. R. Sehgal, Director (Investigations).	Ditto.

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APPENDIX IV

[*Vide* Paragraph 3.1]

List of persons who attended the Commission's public inquiry on 19th December, 1962

Name of the representative	Name of the firm/body represented
(A) PRODUCERS (LARGE-SCALE) :	
1. Shri S. Dorresteyn	Electric Lamp Mfrs. (India) Private Ltd., 1, Taratolla Road, Garden Reach, Calcutta-24. and Hind Lamps Ltd., Shikohabad, Uttar Pradesh.
2. ,, M.L. Gauba	Hind Lamps Ltd., Shikohabad, Uttar Pradesh. and Allied Lamp Exporter, 45-47, Veer Nariman Road, Bombay-1.
3. ,, T. K. Roy	Bengal Electric Lamp Works Ltd., 137, P.G.H. Shah Road, Jadavpur, Calcutta-32.
4. ,, M. K. Sen	
5. ,, F. Bhowmik	
6. ,, D. Seshachar	Mysore Lamp Works Ltd., Old Tumkur Road, Post Science Institute, Bangalore-12.
7. ,, R. Sengputa	Philips India Ltd., 7, Justic Chandra Madhab Road, Calcutta-20.
8. ,, E. J. Jansen	
9. ,, F. C. Rauwenhoff	
10. ,, R. M. Kshattriya	Pradip Lamp Works, P.O. Begumpur, Patna-9.
11. ,, H. Sinha	Bharat Electrical Industries Ltd., 52, Hindusthan Building, 6-A, S.N. Banerjee Road, Calcutta-13. and Indian Lamp Factories Association, P-11, Mission Row Extension, Calcutta-1.
12. ,, V. P. Bhalwankar	Lumina Electrical Industries, Bhavanishankar Cross Road, Dadar, Bombay-28.
13. ,, S. N. Roy	Calcutta Electric Lamp Works Ltd., 3, Mangoe Lane, Calcutta-1.
14. ,, D. G. Bhagwat	Bijlee Products (India) Pvt. Ltd., 36, Lamington Road, (North), Bombay-8.
15. ,, G. G. Karmarkar	
16. ,, G. A. Joshi	

Name of the representative	Name of the firm/body represented
17. Shri R. G. Gupta	Glass and Miniature Bulb Industries, Behari Niwas, Kanpur.
18. ,, A. Sriniwasan	B. Chowdhury & Co., Indian Globe Chambers, Fort Street, Bombay-1.
19. ,, S. N. Patil	
(B) PRODUCERS (SMALL-SCALE) :	
20. Shri B. Dhowan	Sunder and Kapoor, 107, Commerce House, Medows Street, Bombay-1.
(C) PROSPECTIVE PRODUCERS :	
21. Shri P. Arunachalam	Tube Supplies Ltd., P.B. No. 60, 6, Armenian Street, Madras-1.
(D) CONSUMERS :	
22. Shri G. Fernandes	The Controller of Stores, Central Railway, Bombay-1.
23. ,, B. S. Seth	The Controller of Stores, Western Railway, Churchgate, Bombay-1.
24. ,, S. M. Masurekar	The Municipal Commissioner, Bombay Municipal Corporation, Bombay-1.
25. ,, I. A. Moses	The Millowners' Association, Elphinstone Building, Veer Nariman Road, Bombay-1.
26. ,, R. L. M. Vijayanagar	
27. ,, D. M. Desai	Lighting Equipment & Asccessories Mfrs. Association Ltd., 195/197, Abdul Rheman Street, Bombay-3.
28. ,, C. C. Desai	
29. ,, D. C. Shirodkar	
(E) DEALERS ASSOCIATIONS :	
30. Shri P. B. Pankh.	The Electric Merchants Association, Vithal Sayana Building No. 2, Lohar Chawl, Bombay-2.
31. ,, V. D. Sheth	
32. ,, V. B. Kapadia	
33. ,, H. G. Mehta	The Electrical Merchants' Association, Sankara Buildings, Chickpet, Bangalore-2.
34. ,, S. Jain	The Electrical Merchants' Association Gandhi Bag, Nagpur.
35. ,, B. Tawari	
36. ,, S. K. Bagdi	
(F) RAW MATERIALS/COMPONENTS SUPPLIERS :	
37. Shri P. P. Chandra	Seraikella Glass Works Pvt. Ltd., P.O. Konnagar, Distt. Hooghly, West Bengal.
38. ,, S. A. Trasy	R.S. Traders, 16, Peoples Building, Sir P.M. Road, Bombay-1.
39. ,, G. N. Rao	Tungsten of India Ltd., United Bank of India Building, Sir P.M. Road, Bombay-1

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Name of the representative	Name of the firm/body represented
(G) SELLING AGENTS :	
40. Shri H. N. Mirchandani	Bajaj Electrical Ltd., 45-47. Veer, Nariman Road, Bombay-1.
41. „ R. K. Bajaj	
42. „ V. K. Sant	
43. „ V. Kripalani	
44. „ J. M. Sandford	General Electric Co. of India Ltd., Magnet House, Chittaranjan Avenue, Calcutta-13.
45. „ V. Mehrotra	Allied Lamps Exporters, 45-47, Veer Nariman Road, Bombay-1.
(H) GOVERNMENT DEPARTMENTS :	
46. Shri P. N. Deobhakta	The Senior Industrial Adviser, Development Wing, (Engineering Directorate), Udyog Bhavan, Maulana Azad Road, New Delhi.
47. „ B. S. Narula	The Development Commissioner, Small-scale Industries, Udyog Bhavan, Maulana Azad Road, New Delhi.
48. „ N. K. Ramaswamy	The Director, Indian Standards Institution, Manak Bhavan, Mathura Road, New Delhi.
49. „ M. M. Mistry	The Director of Co-ordination & Statistics, Directorate General of Supplies & Disposals, National Insurance Building, Parliament Street, New Delhi.
50. „ S. M. Lad	The Secretary to the Govt. of Maharashtra, Industries and Labour Department, Sachivalaya, Bombay-1.
51. „ P. A. Sabnis	
52. „ V. Kumar	The Secretary, Engineering Export Promotion Council, India Exchange, 7th Floor, India Exchange Place, Calcutta-1.

APPENDIX V

[*Vide* Pararaph 4·2·3]

(A) *Statement showing the existing, additional and total licensed capacities for the production of (i) G.L.S. and other allied lamps, (ii) Miniature and other allied lamps, (iii) Fluorescent tubes and (iv) High pressure mercury vapour lamps.*

(In million numbers)

		GLS and other allied lamps			Miniature and other allied lamps			Fluorescent tubes			High pressure mercury vapour lamps		
Sl. No.	Name of the unit	Existing capacity	Additional capacity licensed	Total licensed capacity	Existing capacity	Additional capacity licensed	total licensed capacity	Existing capacity	Additional capacity licensed	Total licensed capacity	Existing capacity	Additional capacity licensed	Total licenced capacity
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Existing Units												
1.	Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta.	16·00	..	16·00	3·00	..	3·00	2·10	..	2·10	0·100	..	0·100
2.	Hind Lamps Ltd., Shikohabad	14·00	..	14·00	9·00	..	9·00	1·00	..	1·00	..	..	..
3.	Philips India Ltd., Calcutta.	5·00	..	5·00	..	..	..	..	..	..	..	..	..
4.	Bengal Electric Lamp Works Ltd., Calcutta.	9·00	..	9·00	..	3·00	3·00	..	0·90	0·90	..	..	..
5.	Bharat Electrical Industries Ltd., Calcutta.	6·40	..	6·40	..	6·00	6.00	..	1·20	1·20	..	0·100	0·100

6. Pradip Lamp Works, Patna. . . .	3·80	3·80	7·60	6·00	3·00	9·00	0·20	0·80	1·00	0·030	0·070	0·100
7. Mysore Lamp Works Ltd., Bangalore .	3·90	6·10	10·00	..	6·10	6·10	..	1·00	1·00	..	0·015	0·015
8. Bijlee Products (India) Pvt. Ltd., Bombay.	1·25	..	1·25	..	..	..	..	..	..	..	..	..
9. Calcutta Electric Lamp Works, Ltd., Calcutta.	1·25	..	1·25	0·10	..	0·10	..	..	..	..	..	..
10. Asia Electric Lamp Co. Pvt. Ltd., Calcutta.	1·00	..	1·00	0·70	..	0·70	..	..	..	..	..	..
11. Bharat Electric Bulb Works Ltd., Calcutta.	0·25	..	0·25	..	..	..	..	..	..	..	..	..
12. Hindusthan Lamps and Fluorescent Tubes Ltd., Calcutta. .	0·75	..	0·75	..	2·70	2·70	..	0·03	0·03	..	..	..
13. Auto Lamps Ltd., Delhi	..	..	..	1·15	1·65	2·80	..	..	..	..	..	..
14. Shankar Miniature Bulb Industries Pvt. Ltd., Dehra Dun .	..	..	..	1·00	2·00	3·00	..	..	..	..	..	..
15. Miniature Bulb Industries of India, Dehra Dun	..	0·24	0·24	3·00	1·50	4·50	..	..	..	..	..	..
16. Lumina Electrical Industries, Bombay .	..	..	..	1·00	..	1·00	..	..	..	..	..	..
17. Glass and Miniature Bulb Industries, Kanpur	..	..	..	3·80	..	3·80	..	0·96	0·96	..	..	..
18. B. Chowdhury & Co., Bombay . .	..	..	..	..	..	..	..	..	..	0·030	..	0·030
TOTAL OF EXISTING UNITS .	62·60	10·14	72·74	28·75	25·95	54·70	3·30	4·89	8·19	0·160	0·185	0·345

APPENDIX V—*contd.*

1	2	3	4	5	6	7	8	9	10	11	12	13	14
	New Units												
19.	Tube Suppliers Ltd., Madras . .	..	2·70	2·70	..	..	..	..	..	..	..	..	..
20.	Bharat Electric Co. Ltd., Trivandrum .	..	0·62	0·62	..	..	..	..	..	..	..	..	..
21.	Zenith Lamps & Elecl. Ltd., Madras .	..	6·00	6·00	..	..	..	..	1·20	1·20	..	..	..
22.	Leuna Lamps Ltd., Baroda . .	..	..	..	..	2·50	2·50	..	1·00	1·00	..	..	..
23.	Geep Flashlight Indus. Ltd., Allahabad .	..	..	..	..	6·00	6·00	..	..	..	..	..	..
24.	Laxman Industries Ltd., Delhi . .	..	..	..	..	..	..	..	1·20	1·20	..	0·030	0·030
25.	Teknihumen Pvt. Ltd., Bombay . .	..	..	..	..	..	..	..	..	..	..	0·030	0·030
	TOTAL OF NEW UNITS.	..	9·32	9·32	..	8·50	8·50	..	3·40	3·40	..	0·060	0·060
	GRAND TOTAL . .	62·60	19·46	82·06	28·75	34·45	63·20	3·30	8·29	11·59	0·160	0·245	0·405

APPENDIX V—*Contd.*

(B) *Statement showing the annual installed capacity and production of electric lamps in the organised and small-scale sectors during the years* 1958 *to* 1962 (*Jan.-June*)

(In million numbers)

Sl. No.	Name of the producer	Annual installed Capacity	Production				
			1958	1959	1960	1961	1962 (Jan.-June)
	(a) ORGANISED SECTOR						
	(*i*) *GLS and other allied lamps*						
1.	Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta	16·00	10·40	11·43	14·50	15·29	8·10
2.	Hind Lamps Ltd., Shikohabad	14·00	8·19	8·26	9·60	12·39	6·97
3.	Bengal Electric Lamp Works Ltd., Calcutta	9·00	4·98	6·61	7·16	7·70	3·87
4.	Bharat Electrical Industries Ltd., Calcutta	6·40	2·32	2·77	3·17	3·03	1·67
5.	Mysore Lamp Works Ltd., Bangalore	3·90	1·88	2·03	2·27	2·38	1·23
6.	Pradip Lamp Works, Patna	3·80	1·01	1·49	1·59	1·55	0·65
7.	Bijlee Products (India) Private Ltd., Bombay	1·25	0·22	0·33	0·48	0·90	0·59
8.	Calcutta Electric Lamp Works Ltd., Calcutta	1·25	0·32	0·35	0·48	0·62	0·54
9.	Asia Electric Lamp Co. Pvt. Ltd., Calcutta	1·00	0·20	0·32	0·41	0·71	0·43
10.	Bharat Electric Bulb Works Ltd., Calcutta	0·25	0·02	0·05	0·12	0·14	0·09
11.	Hindusthan Lamps and Fluorescent Tubes Ltd., Calcutta	0·75	0·04	0·05	0·05	0·26	0·31
12.	Philips India Ltd., Calcutta	5·00	..	..	..	..	0·73
	TOTAL	62·60	29·58	33·69	39·83	44·97	25·18

APPENDIX V—(*contd.*)

Sl. No.	Name of the producer	Annual installed Capacity	Production 1958	1959	1960	1961	1962 (Jan.-June)
	(ii) Miniature and other allied lamps						
1	Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta	3·00	..	..	..	3·18	1·57
2	Hind Lamps Ltd., Shikohabad	9·00	5·96	6·23	6·26	9·67	4·97
3	Pradip Lamp Works, Patna	6·00	1·41	3·00	2·98	3·38	1·41
4	Calcutta Electric Lamp Works Ltd., Calcutta	0·10	0·01	0·06	0·07	0·07	0·05
5	Asia Electric Lamp Co. Pvt. Ltd., Calcutta	0·70	0·67	0·47	0·58	0·42	0·24
6	Auto Lamps Ltd., Delhi	1·15	0·09	0·75	1·00	0·92	0·60
7	Shankar Miniature Bulb Industries Pvt. Ltd., Dehra Dun	1·00	..	..	0·43	0·81	0·39
8	Miniature Bulb Industries of India, Dehra Dun	3·00	0·60	1·50	1·70	2·86	1·45
9	Lumina Electrical Industries, Bombay	1·00	0·44	0·52	0·71	0·87	0·50
10	Glass and Miniature Bulb Industries, Kanpur	3·80	1·48	2·88	3·92	3·60	1·53
	TOTAL	28·75	10·64	15·35	17·65	25·78	12·71
	(iii) Fluorescent tubes						
1	Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta	2·10	0·97	1·07	1·48	1·83	1·01
2	Hind Lamps Ltd., Shikohabad	1·00	..	..	..	0·20	0·47
3	Pradip Lamp Works, Patna	0·20	0·02	0·03	0·05	0·07	0·03
	TOTAL	3·30	0·99	1·10	1·53	2·10	1·51

(iv) High Pressure Mercury vapour lamps.

1	Electric Lamp Manufacturers (India) Pvt. Ltd., Calcutta	0·100	..	..	..	0·010	0·022
2	Pradip Lamp Works, Patna	0·030	0·002	0·012	0·013	0·014	0·006
3	B. Chowdhury & Co., Bombay	0·030	0·002	0·002	0·016	0·020	0·013
	TOTAL	0·160	0·004	0·014	0·029	0·044	0·041

(b) SMALL-SCALE SECTOR (Capacity and production of miniature lamps)

1	H.M. Vakharia, Poona	1·60	N.A.	..	..	0·17	0·15
2	Hindustan Miniature Bulbs Mfg. Co., Dehra Dun	1·20	N.A.	..	0·09	N.A.	N.A.
3	Sunder and Kapoor, Bombay	3·60	N.A.	..	..	0·19	0·70
4	Bishamber Dayal Shriniwas, Firozabad	2·10	N.A.	..	0·06	0·27	0·15
5	Pioneer Automobile Co., Calcutta	0·60	N.A.	..	..	..	N.A.
6	Rakesh Bulb Industries, Poona	2·40	N.A.	..	0·04	0·12	0·19
7	Associated Indian Electricals, Calcutta	0·30	N.A.	..	..	..	N.A.
8	Sri Mahavir Lamp Works, Kanpur	2·70	N.A.	..	0·12	0·20	0·11
9	Bagla Miniature Bulb Industries, Kanpur	3·12	N.A.	..	0·35	0·70	0·29
10	Eskay Industries, Bombay	1·90	N.A.	0·20	0·30	N.A.	N.A.
11	Jain Miniature Bulb Industries, Kanpur	2·85	N.A.	..	..	0·34	0·41

APPENDIX V—*Contd.*

(b) SMALL-SCALE SECTOR (Capacity and production of miniature lamps)

(In million numbers)

Sl. No.	Name of the producer	Annual installed Capacity	production 1958	1959	1960	1961	1962 (Jan.-June)
12	Orient Electric Lamp Works (Pvt.) Ltd., Calcutta	0·60	N.A.	..	..	0·14	0·01
13	Tube Light Starter Manufacturing Co., Howrah	1·50	N.A.	N.A.	N.A.	N.A.	N.A.
14	Jupiter Electricals, Patna	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
15	Vidyut Sahakari Mandal Ltd., Poona	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
16	Everlite Lamps, Kanpur	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	TOTAL	23·37	N.A.	0·20	0·96	2·13	2·01

APPENDIX VI

[*Vide* Paragraph 7.1]

Process of manufacture and salient features of electric lamps.

1. The main classifications of electric lamps are (1) tungsten filament incandescent lamps which include the general light service (GLS) lamps, automobile bulbs and miniature bulbs and (2) gaseous discharge lamps which include fluorescent tubes and high pressure mercury discharge lamps. The source of light in case of incandescent lamps is the tungsten filament heated to incandescent stage by passage of electricity. In case of gaseous discharge lamps luminosity results from the gas itself like mercury or sodium vapours, neon, argon or krypton by passing electric current through it, the colour of the light depending on the gas and its pressure. Some of the salient features of the lamps and their process of manufacture are briefly described below. A flowsheet showing components and sequence of operations for GLS lamps is given at the end of this Appendix.

2. *Incandescent lamps*

2.1. Incandescent lamps (GLS lamps) consist of a resistance wire called filament, made out of tungsten, hermetically sealed in a glass shell which is either made vacuum or filled with an inert gas. Tungsten is used as filament since it has the highest melting temperature (3387°C) among all elements except carbon. The representative operating temperature of a modern lamp filament would vary from about 2375° C for a 40 watt lamp to about 3725° C for 2000 watt projector lamp. The mechanical problems associated with the tungsten filament make these lamps inherently compact and they need to be somewhat spherical in structure. The filament's length and diameter limit its range of operation between 1·5 and 300 volts. Low voltage lamps such as for automobiles and torches are relatively rugged. At higher voltage, say 300, the filament is very long and slender and difficult to support.

2.2. The main parts of an electric lamp are a filament, filament support (not necessary in case of low voltage lamps), lead-in-wires, a stem, glass shell and a cap.

2.3. Filaments are formed differently, usual forms being single coil and coiled coil. Coils are formed out of tungsten wire by winding it on a mandrel of steet wire for single coil and of molybdenum wire for coiled coil. The mandrel is subsequently dissolved away by boiling in dilute acid leaving the tungsten coil in the desired form. These coils are subsequently heat treated for setting. Some of the units are making tungsten filaments from wires which are single coil.

2.4. The filament is supported on molybdenum wires inserted in a glass stem. The two ends of the filament wire are connected to the lead-in-wires which are made of three pieces welded end to end. The first is a nickel portion whose termial is clamped on the filament terminal. The middle one, on which the glass of the stem is squeezed, is copper coated. The last is the copper portion which also acts as fuse and projects through the base, its ends being finally soldered to the brass terminal plates embedded in the base.

2.5. Vacuum favours evaporation of tungesten at higher temperatures. This darkens the lamp and results in loss of light and early failure of filament. Gas filled lamps nearly eliminate this disadvantage. Gas filled lamps are evacuated like vaccum lamps, rinsed with nitrogen twice or thrice and finally filled with an inert gas usually argon at atmospheric pressure. Due to better cooling the filament can be heated to a substantially higher temperature with increase in its efficiency. Increased cooling would, however, increase loss of heat for which reason the filament is made and mounted in a more compact manner.

2.6. The glass required for the lamp should fuse readily; it should be adaptable to the mechanical methods of production; it should fit in the lamp base and give a close fused joint under flame heating; it should be clear and should not divercify or discolour when exposed to flame. Generally lead glass is used for the manufacture of glass shells. The lamps are also pearl finished by internal frosting which considerably reduces the glare without reducing the overall quantity of light or made as coloured lamps either by coating the inner surface with pigments or by employing coloured glass. The size of the shell/lamp varies with the rating of the lamp and is also specified by IS:418. Glass shells are either made manually or mechanically. Mechanically blown shells are more uniform in quality and more economical in cost of production. These are, therefore, likely to replace in due course the hand blowing of shells. The cost could be further reduced by highly mechanised plants like Cornin' "ribbon" plants used in some Western countries. The present requirements of shells in India would not, however, justify investment on such a plant. The glass for the inner components of the lamp consists of the tube for flange, rod for supporting filament and an exhaust tube. All these should have a low softening point.

2.7. In the first operation the flange tube is cut to size and one end is heated and flanged. This is either done on an automatic machine called flare machine or by hand. In the next operation done on stem machine the flange tube is placed with flange upward; the rod, the exhaust tube and the lead-in-wires are placed in correct position and jet flame is directed from opposite sides at the lower end of the flange where all the three glass parts of the stem fuse. When the glass becomes soft, it is pressed or pinched flat at that spot. While it is still soft, air at pressure is blown through the exhaust tube so as to puncture a hole in the flange tube where exhaust tube meets the flange. The subsequent exhausting and gas filling operations are done through this hole and exhaust tube. The stems are then annealed.

2.8. The subsequent operation consists of the mounting of filament on the stem. The ends of lead-in-wires are flattened, ends of filament offered to the ends of welds and the weld ends clinched over filament extremities, filament end swung clear and rod end heated and flattened to make it slightly bulbous, the required number of molybdenum wires are inserted in the bulbous portion of the rod and the molybdenum support wires are looped in to support the filament. In the automatic machines it is done on a single machine called mounting machine whereas in others it is done on two or three simpler machines, the mounting of filament being done manually. The filament is dipped in a solution called gettering solution mainly of phosphorous. This is in order to let it combine with any trace of oxygen that may be still remaining inside the shell and avoid damage to the filament. In the next sequence of operations the stem is placed in a vertical position so that the filament is at the top. The glass shell is now placed in a position (neck down) and is heated by flames around the neck at the level of the flange. Eventually the stem flange and glass shell neck get fused together and sealed. Next the exhaust tube is connected to the exhausting (and gas filling) device. After exhausting (and gas filling) operation is completed the exhaust tube is heated and sealed. This is done on exhaust and sealing machine. In the next sequence of operations, cement is applied to the brass caps which are then placed in position. The lead-in-wires are taken out of the two holes provided in the cap. The lamp is then passed through a chamber sufficiently heated to bake the cement and effect the joint between the metal cap and the glass bulb. The excess lengths of lead-in-wires are cut off and the eyes in the cap connecting the lead-in-wires soldered. The lamp is now ready for use.

2.9. In the more automatic plants the movements of components from one machine to another are also on automatic conveyors. One set of machinery comprising of flare machine, stem machine, exhausting and sealing machine and capping machine all with matching capacity and maintaining the flow of the components from one machine to the subsequent one with finished lamps being turned out at the end of the line is called a chain or line of machinery. In more automatic plant the movement of components from one machine to another is automatic and mechanical. In other cases the transport is manual. With some of the plants these various types of machinery are installed in batches instead of in line. The aggregate capacity of the various sections matching with the aggregate capacity of the other sections. The slow speed chains have an output of about 600 pieces an hour. The medium speed chains which are mainly installed with ELMI-Hind and Philips as well as those now obtained by Bengal Lamps and Bharat Electric Industries are of medium speed with an output of about 1,200 lamps per hour. It is understood that modern machinery as is now available and called high speed machine has an output of about 2,000 to 2,500 lamps per hour. This has not yet been installed by any of the producers in India.

2.10. The lamps are tested during the process of manufacture. These tests include vacuum test by high frequency tester, graded voltage test, photometer test wattage test, life and vibration test, cap torsion test, etc.

3. *Miniature lamps, auto lamps, etc.*—As indicated by the name of these lamps they are of small size and normally of low voltages and wattages such as for torches, automobiles, etc. The principle and the process of manufacture is generally on the lines of vacuum GLS lamps. Some of the lamps like auto head lamps, which are comparatively of higher wattage, are gas filled. Due to low voltage and therefore more sturdy filament, molybdenum support wires are generally unnecessary and the filaments in some cases are spot welded to the ends of lead-in-wires. The mounting of filament, the stem and lead-in-wires vary according to the size and requirement of the lamp. Shells of smaller sizes are blown from imported tubes whereas those for larger size lamps are imported.

4. *Fluorescent tubes*

4.1. In case of flourescent tubes, instead of one filament inside the glass shell there are two filaments on either side of the tube. The light is not provided by the glow of filaments as in case of incandescent lamps but by the passage of the electricity through mercury vapour at a low pressure. The stem is shorter and the filament is mounted directly on the lead-in-wires. The tubes are made of soda lime glass and are coated inside by a fluorescent powder which converts the ultra voilet energy into visible light energy. Exhausting arrangements by way of exhaust tube and blowing of hole in the stem is provided only on one side and is similar to the one in the case of incandescent lamps. After exhausting, a few drops of mercury are dorpped in the tube. The filaments are coated by dipping in an electron emissive powder, normally one of the alkaline earth oxides for emission of electrons. Fluorescent tubes at present produced in the country are principally hot cathode preheat starting type of 20, 40 and 80 watts. Although at a frequency of 50 cycles the flicker of the lamps is not usually noticeable it may produce unpleasant stroboscopic effects when moving objects come in view. One method of overcome this is to operate in pairs or threes on 2 or 3 phase circuits respectively. The lamp itself has a high power factor but due to reactive ballast used to stabilize the arc, the power factor gets reduced to about 50 per cent. This is improved upon by introducing a capacity in the circuit thereby improving the power factor to about 90 per cent.

4.2. As stated earlier the ultra violet radiation in the tube gas is converted into light energy by means of fluorescent coating in the inside of the tubes. The efficiency of this conversion is sensitive to changes in the tube wall temperature reaching a maximum in the range of about 38 to 49° C, corresponding to an ambient air temperature of 18 to 29·5° C in still air.

4.3. Efficiency of fluorescent lamps, *i.e.* percentage of electrical energy converted into light energy is serveral times more than that of incandescent lamps as will be seen from the following comparison :—

Lamp wattage		Incandescent lamp 230-250 v.	Fluorescent lamp starter type instant start
25	Rated initial lumens	200	1,600
	Lumens per watt	8·0.	80
100	Rated initial lumens	1,220	4,850
	Lumens per watt	12·2	48·5

5. *Mercury vapour lamps.*—The medium and high pressure mercury vapour lamps also belong to the category of discharge lamps. The mercury pressure may vary from one half of an atmosphere to several atmospheres. This increase in vapour pressure results in decreasing the volume of the arc and therefore reducing the size of the lamp. The arc temperature also increases correspondingly. This necessitates use of special glass for pressures upto a few atmospheres and after certain pressure fused quartz is used. Lamps with very high pressure require water cooling. Only a small range in the high pressure mercury vapour lamps are manufactured at present in the country. These mostly make use of the arc tube made of fused quartz the arc tube assembly being termed as quartz burners. The quartz burners are not yet made in the country and are imported. For the 80 and 125 watt sizes use of outer shell (inside which the quartz burner is sealed) in normal shape and of soft glass is also made. The higher wattage lamps make use of specially hardened glass for stem and for outer shell. The outer shell is given a shape so as to have more or less a uniform temperature over its surface. Owing to high temperature of the arc tube, the fluorescent coating cannot be applied directly to the tube but is coated on the inside of the outer bulb. The coating can be applied both by wet or by dry method. The sizes of lamps in this category at present manufactured in the country are 80 1000 watts.

6. *Photoflash lamps.*—The photo flash lamps would not fall under either of the two categories mentioned above. The lamps have a medium size shell and are filled with extremely thin aluminium shavings made from aluminium foil. The shavings are dipped in Zirconium.

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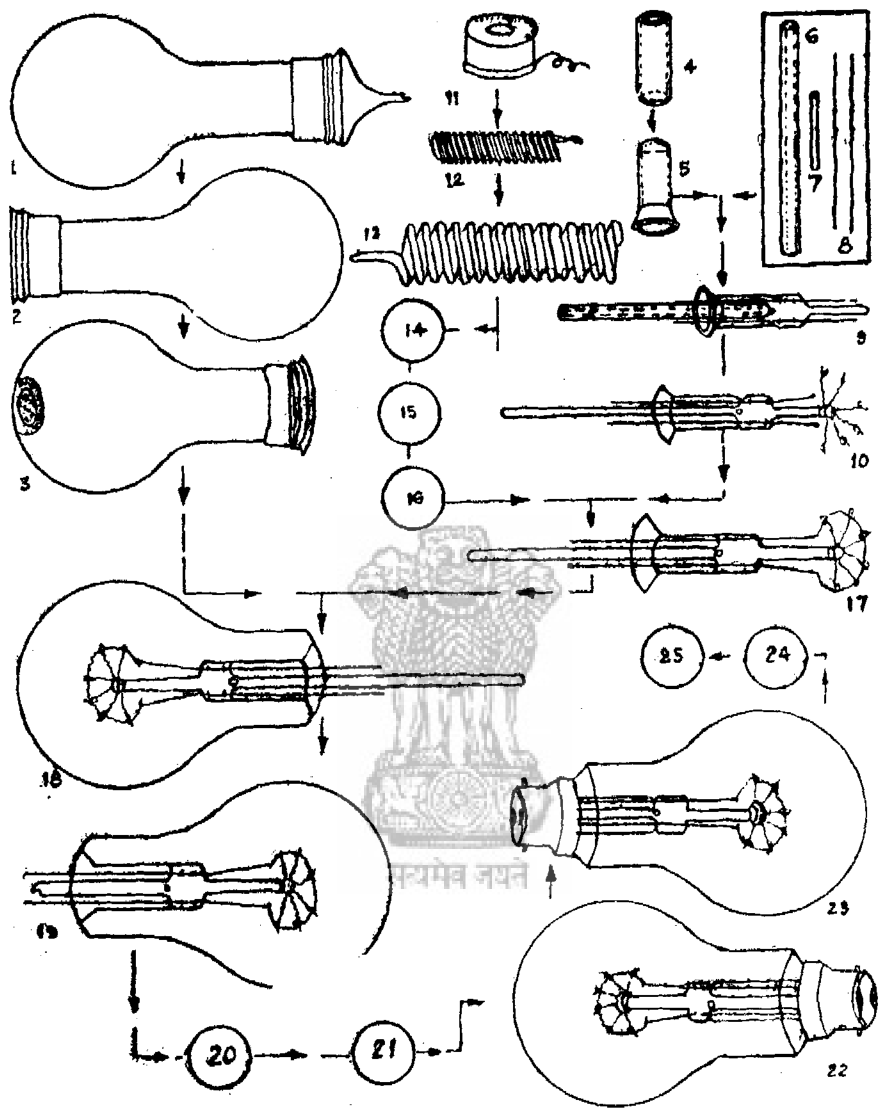

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INCANDESCENT ELECTRIC LAMP- *From the Raomaterial to the finished product*

1) Glass shell as received in the works; (2) Neck cut shell washed; and dried; (3) Sheil stamped with maker's brand and seal; (4) Flange tube; (5) Same tube after flanging; (6) Exhaust tube; (7) Arbor rod; 8) Trimetallic electrodes of nickel, copper, and copper-clad nickel iron; (9) Foot comprising flanged tube; arbor rod, and lead-in wires; (10) *Free end of arcor rod hubbed and molybdenum wires inserted*; the wires are cut to proper size and ends hooked for supporting filament; (11) Filament wire; (12) Spiralled filament prepared by close-winding over a mandril wire of special steel; (13) Spiralled wire cut to proper length, mandril dissolved out, and washed; (14) Length of spiralled filament checked by weighing in a torsion balance; 15) *Filament checked for fringing by inspection of magnified image*; (16) Filament heated in an electric furnace in a hydorgen-nitrogen atmosphere; (17) Filament mounted on supports and ends connected to lead-in wires; (18) Filamented foot mounted in bulb, flanged edge fused to neck leaving exhaust tube and electrodes outside; (19) Vacuum created by exhaust pumps, inert gas (argon) inserted (in gas-filled lamps), and exhaust ube sealed; (20) Vacumm tested by high frequency tester; (21) Lamp aged in aging rack and tested; (22) Cap fixed; (23) Protruding ends of lead-in wires cut and soldered to metal contact pieces cover cap; (24) Photometer test for efficiency; (25) Finished lamp subjected to life and vibration tests and cap to torsion tests.

APPENDIX VII

[*Vide* Paragraph 7.2.2]

List of producers of components with their present annual installed and additional licensed capacities.

Names of producers of components	Present annual installed capacity	Additional capacity licensed	Total
	(Million Nos.)	(Million Nos.)	(Million Nos.)
A. Brass caps			
1. Hind Lamps Ltd., Shikohabad	42·0	..	42·0
2. Lamp Caps Pvt. Ltd., Bombay	..	48·0	48·0
3. S.V. Subramaniam & Sons, Bangalore	15·0	..	15·0
4. R.S. Traders, Bombay	..	14·4	14·4
TOTAL	57·0	62·4	119·4
	(Million Nos.)	(Million Nos.)	(Million Nos.)
B. Glass shells			
1. Bengal Electric Lamp Works Ltd., Calcutta	12·0	..	12·0
2. Hind Lamps Ltd., Shikohabad	25·8	..	25·8
3. Pradip Lamp Works, Patna	..	2·4	2·4
4. ELMI Ltd., Calcutta	32·0	..	32·0
5. Laxman Engineering Industries Ltd., New Delhi.	..	15·0	15·0
6. Mysore Lamp Works Ltd., Bangalore	..	20·0	20·0
7. S.V. Subramaniam & Sons, Bangalore	..	7·5	7·5
8. Amin Bros. Ltd., Baroda	..	4·0	4·0
TOTAL	69·8	48·9	118·7

Name of producers of components	Present annual installed capacity	Additional capacity licensed	Total
	(Tons)	(Tons)	(Tons)
C. Glass tudes and rods			
1. Hind Lamps Ltd., Shikohabad . .	804	..	804
2. ELMI Ltd., Calcutta	800	..	800
3. Mysore Lamp Works Ltd., Bangalore .	..	750	750
4. Laxman Engineering Industries Ltd., New Delhi.	..	1,500	1,500
5. Amin Bros. Ltd., Baroda	..	1,440	1,440
TOTAL . . .	1,604	3,690	5,294
D. Lead-in-wires			
1. ELMI Ltd., Calcutta	..	(million nos.) 102	(million nos.) 102
2. Power Cables (P) Ltd., Bombay . .	..	(million metres) 2·88	(million metres) 2·88
E. Tungsten filament wire	(million metres)	(million metres)	(million metres)
1. Philips (India) Ltd., Calcutta . .	..	60	60
2. Tungsten of India Ltd., Bombay . .	..	60	60
3. N.R. Dasgupta, Calcutta	..	60	60
TOTAL	..	180	180
F. Molybdenum wire			
Philips (India) Ltd., Calcutta	..	Kg. 2,400	Kg. 2,400

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